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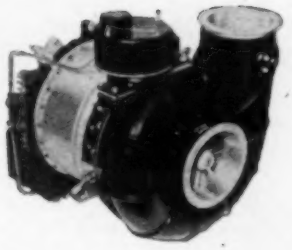

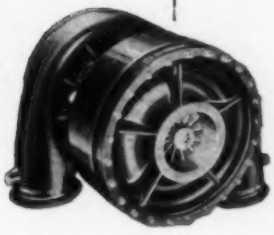

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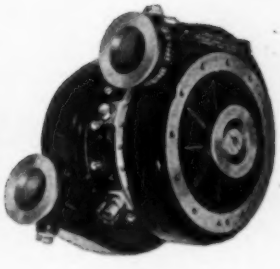

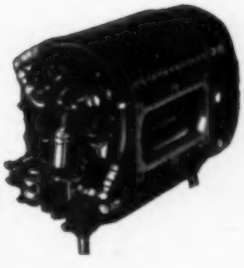

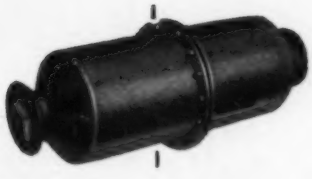

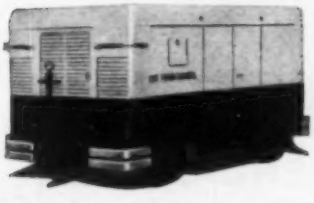

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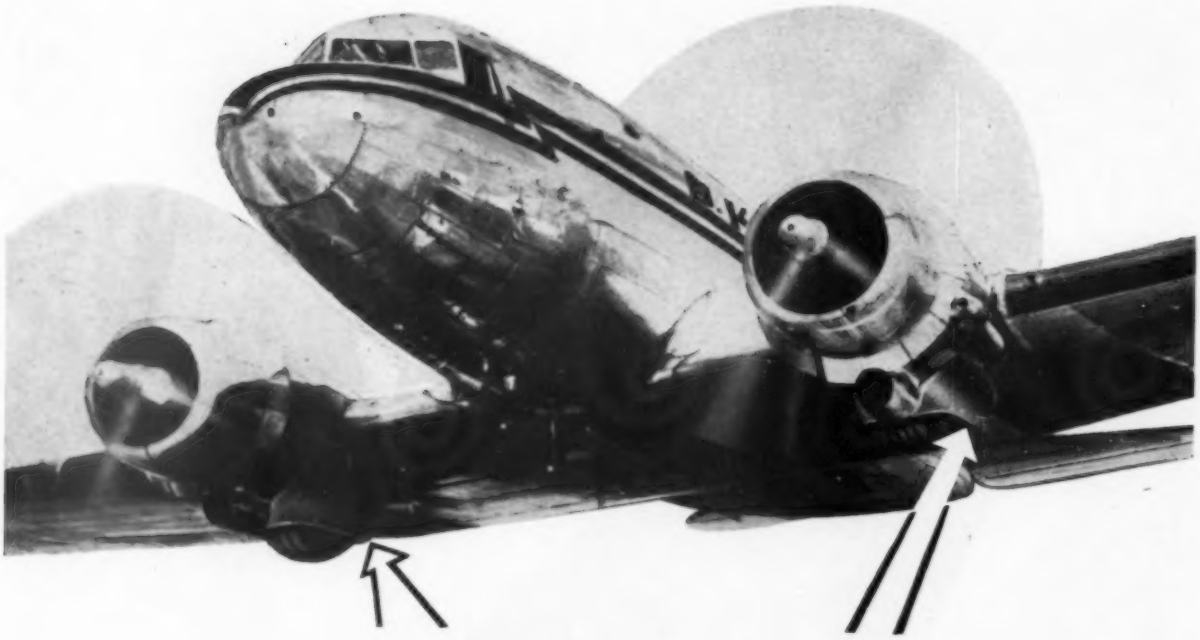

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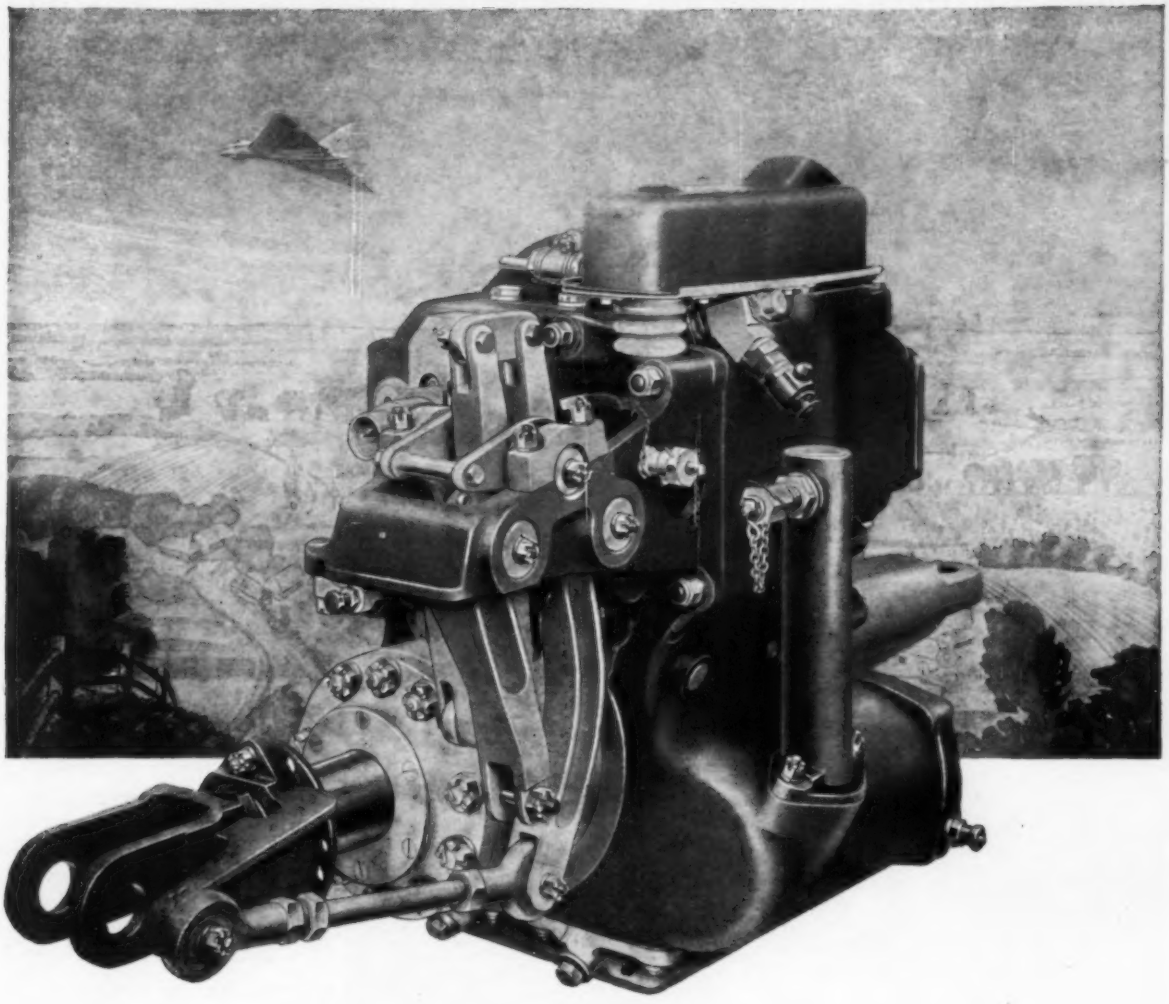

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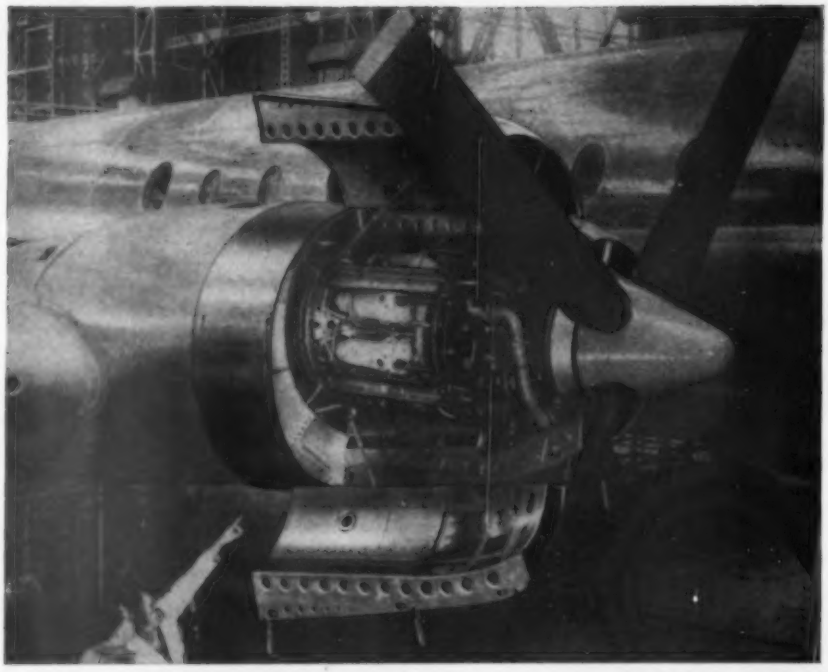

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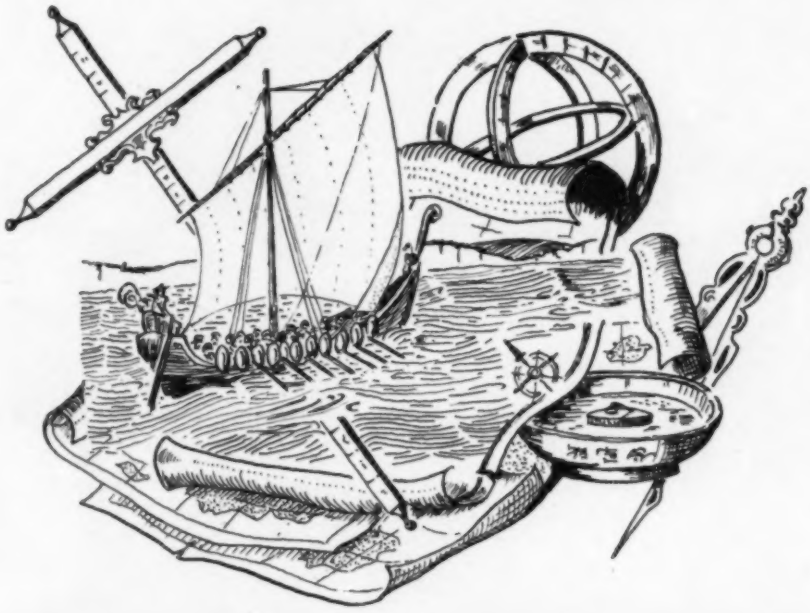

WHO FIRST DISCOVERED BRITAIN?

IT is to be expected that no records exist as to the true original discoverers of Britain. It seems possible that in 500 B.C. MIDACRITUS reached the CASSITERIDES (Scilly Is.). More generally accepted, however, is the voyage of PYTHEAS in about 350 B.C., when he circumnavigated Britain and made several landings. PYTHEAS was a Greek trader of MASILLIA (Marseilles), skilled in the astronomical art and honoured for his contributions to navigation.

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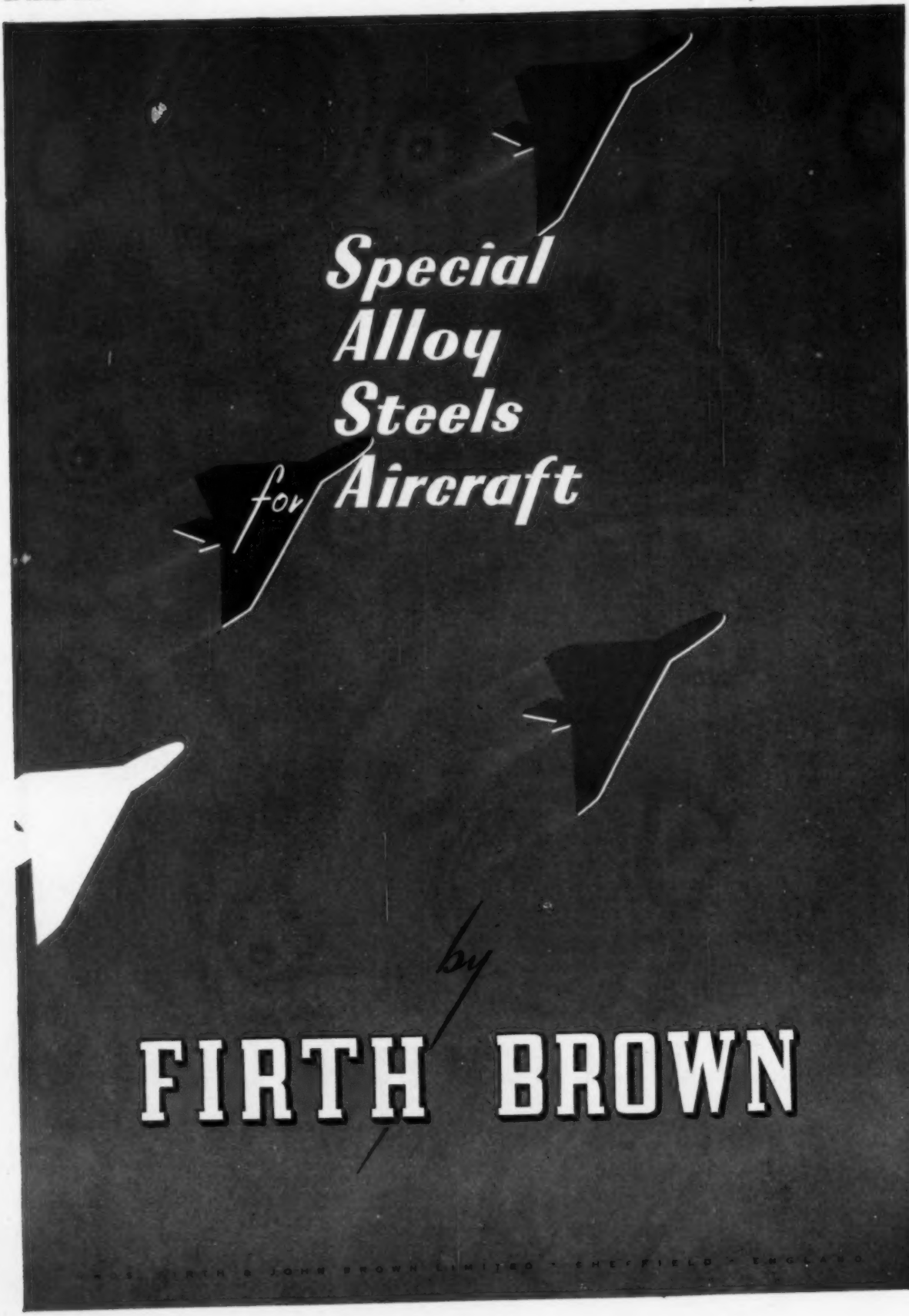
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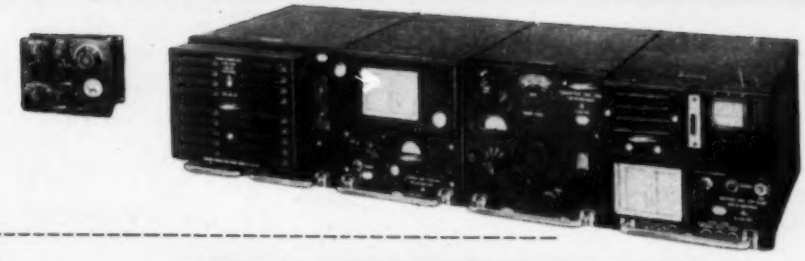

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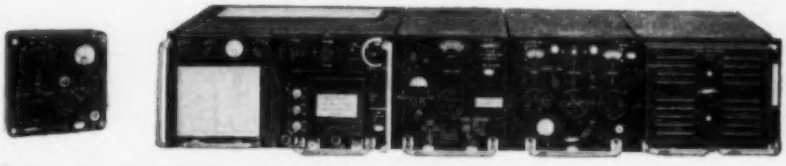

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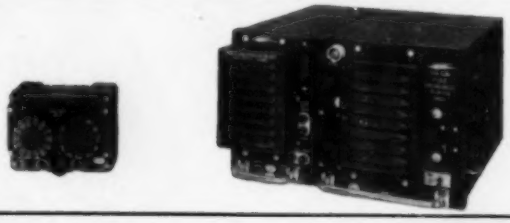

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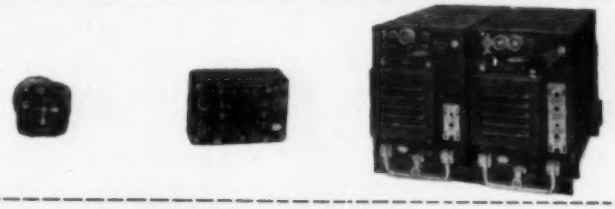

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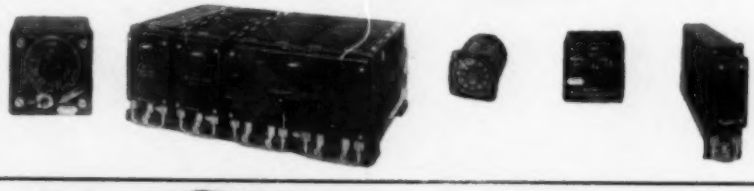

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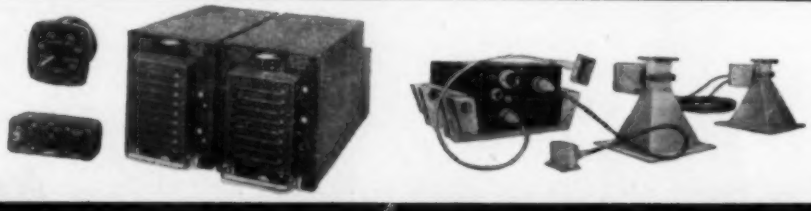

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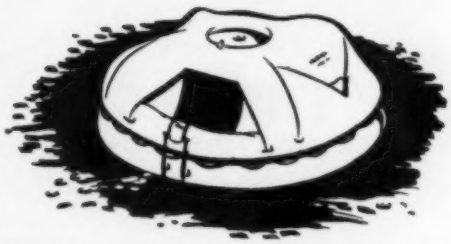

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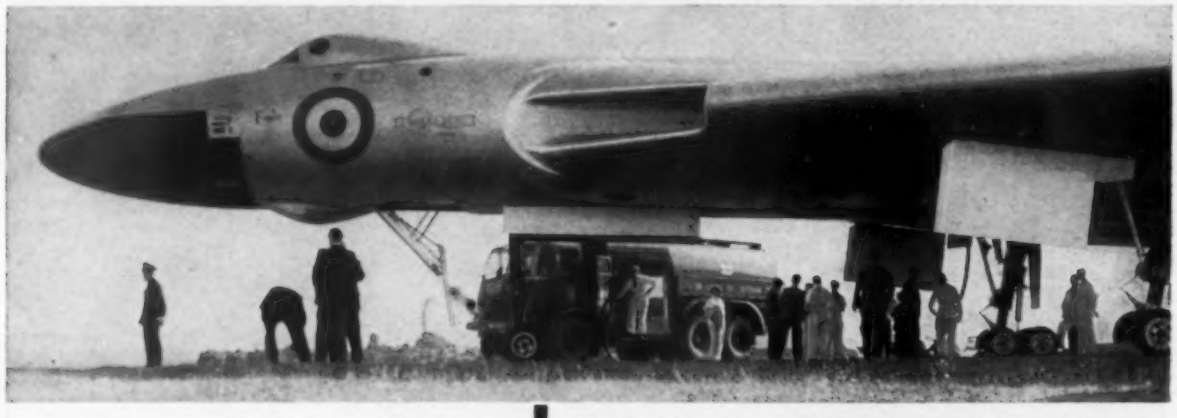

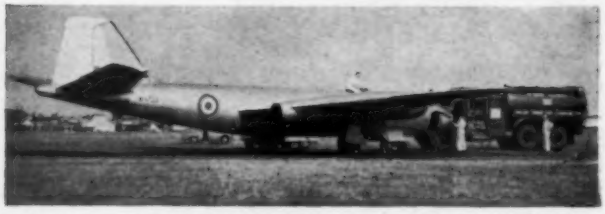

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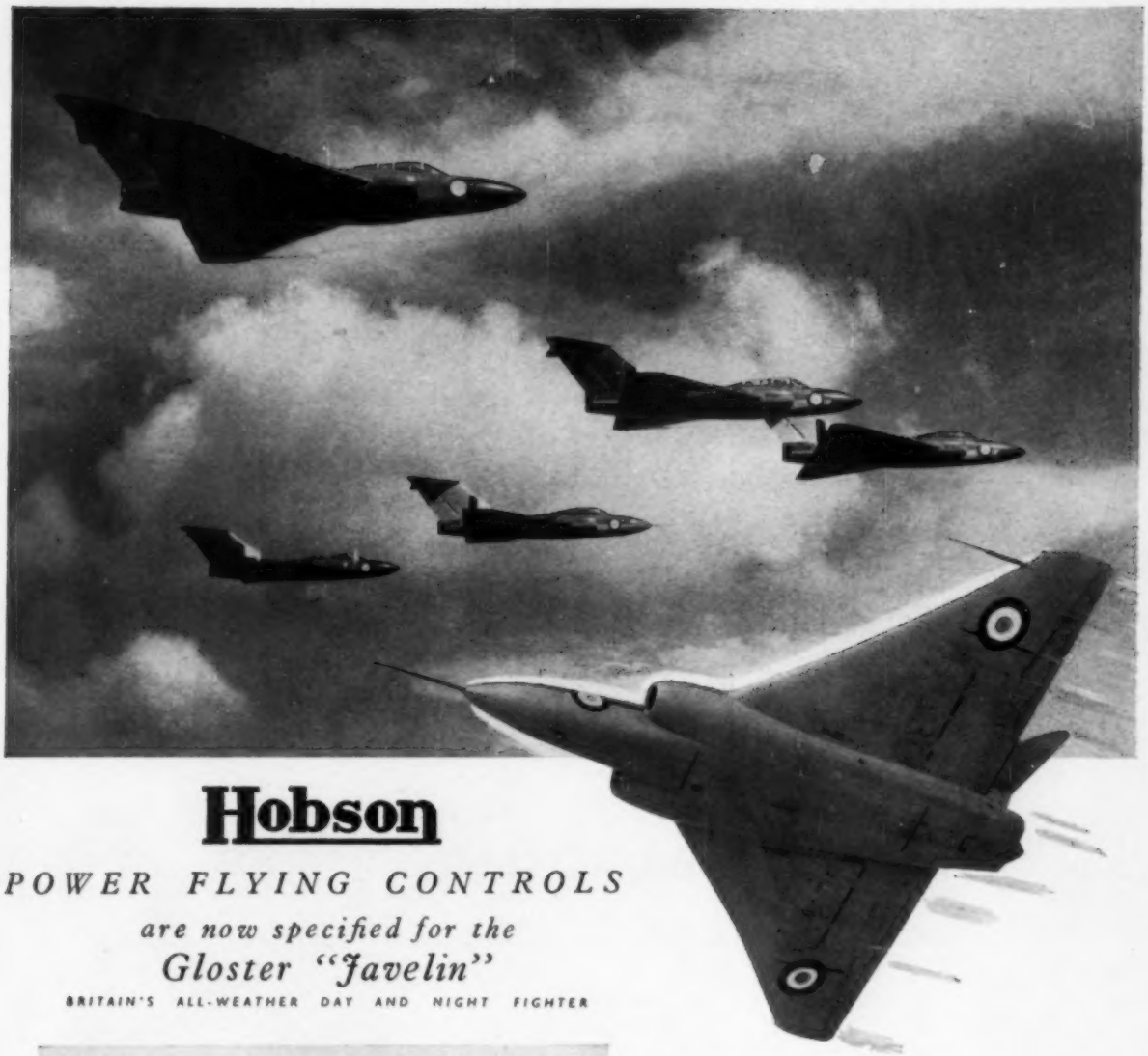

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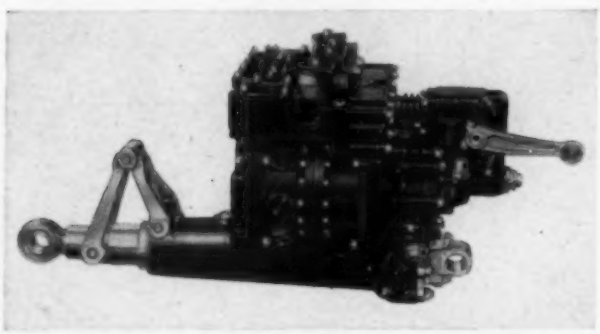

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The Civil Scene

CONSIDERING the immensity of the task of designing, developing, selling and producing a new airliner, it is surprising that any single man, or even any board of directors, is able to summon up the courage to set such a costly process in motion. Because of the time element alone, much of the planning must be based on estimates—or "guestimates," as some people have candidly described them. Market surveys may provide encouragement, but the probabilities of today are a far cry from signed orders five, seven or ten years hence.

That the great aircraft companies of Britain and America—and of France and other countries, too—have been ready to take bold decisions when necessary is amply demonstrated by the contents of this issue of *Flight*, and by the very fact of its annual publication. This year there is a difference which is significant in itself: the development of air commerce has been such that we have been compelled to set aside two special numbers for the subjects which hitherto could be covered in one. In the present issue we review the work of the air operators of the world. A separate number later in the year will be devoted to the aircraft which they fly.

Flying for the Farmer

ALTHOUGH smaller sums of money are involved, and concomitant matters are scaled down in proportion, the task of meeting the requirements of private operators in specialized fields is one which should not be under-estimated. Particularly important, we feel, is the agricultural aircraft. How should a designer approach the difficult situation of knowing that a certain kind of aeroplane is needed, yet of being unable to see sufficient orders to allow him to quote a price which the operator could afford? Obviously, one course is to try to broaden the appeal of the aircraft without reducing its efficiency.

Just such a dilemma has been facing those interested in agricultural aeroplanes since the late 1940s. Dusting, spraying, fertilizing and feeding from the air—here were intriguing jobs for small aircraft. Light transportation and supply-dropping may be added. Complicating considerations have been the acknowledged absence of capital among the many small operators for purchasing new aircraft; the artificial position created by large numbers of wartime light aircraft being given away or sold at scrap prices; and the lack of knowledge as to the extent which helicopters would (both figuratively and literally) enter the field.

In the last two or three years the position has begun to clarify: few of the surplus and often unsuitable aircraft continue to be economical propositions; and a number of soundly based operators have become established and are in a position to consider ordering new, specialized aircraft. Helicopters, expensive to buy and operate, have proved ideal for certain purposes, but seem much less likely to affect seriously the market for fixed-wing agricultural machines than they did six years ago—complement them, yes; displace them in the foreseeable future if at all, no. In fact, for agricultural purposes helicopters have lost ground in some respects—but that is a separate story.

In this country we have always been quick to recognize the possibilities of the air; but more recently, and with exceptions, slower to exploit them. It is gratifying indeed that British aircraft designers have had the courage to go ahead with their plans to supply the markets which most people feel must continue to develop in farming countries. Already flying and progressing well are two very promising agricultural machines, the Auster B.8 Agricola and the Edgar Percival P.9. The first-named is perhaps more single-purpose than the second, and time alone will show which slight adjustment of the balance between specialization and broader appeal to the farming communities will pay, and in what markets. We congratulate both manufacturers on their faith and wish them well in the tremendous task of launching their machines, with all the background organization this entails, in countries overseas.

FROM ALL QUARTERS

TWO GENERATIONS at Cranwell: Air Chief Marshal Sir Dermot Boyle with his son, Sen. U/Off. A. A. Boyle, to whom he had presented the Sword of Honour (see news story below). Sir Dermot is wearing the new ceremonial sash. "Flight" photograph

General Norstad as NATO Chief

IT was announced in the U.S.A. last Friday that General Lauris Norstad is to succeed General Gruenther as NATO Supreme Commander. Gen. Gruenther said in Paris that he felt he should give way to a younger man (he is 57—eight years older than his successor) and he described him as "not only an ideal choice but a better choice than I was."

Lord Montgomery has agreed to continue working as Deputy Allied Commander under Gen. Norstad.

The new Supreme Commander was promoted brigadier-general at 36, and during the war directed operations of the Mediterranean Allied Air Forces. Later he was Chief of Staff of the 20th Air Force, which operated B-29s against Japanese targets. Five years ago he went to Germany as United States Air Commander, and in July 1953 was promoted Deputy Air Commander to Gen. Gruenther.

Soviet Leaders at Marham

A VISIT to a Royal Air Force station—Marham, Norfolk—is part of the programme arranged for Mr. Bulganin and Mr. Kruschev during their present visit to this country. On arrival there at 4 p.m. next Monday, April 23rd, they will be received by the Secretary of State for Air, Mr. Nigel Birch, and senior officers. Then they will see a mass start and rapid take-off by six Canberras, an aerobatic demonstration by four Hunters of No. 43 Sqn., and a fly-past by 12 Valiants, 24 Hunters and 16 Canberras. They will also tour the station living quarters.

M.o.S. Appointment

THE Ministry of Supply announces the appointment of Mr. F. G. R. Cook, B.Sc.(Eng.), A.F.R.Ae.S., A.F.I.A.S., as Director of R.A.F. Fighter Research and Development in succession to A. Cdre. J. A. Hawkings, C.B.E., M.I.Mech.E., who has held the post since May last year. Mr. Cook has been head of the aircraft branch of the British Joint Services Mission, Washington.

Add One Britannia

WHEN Canadian Pacific Air Lines first placed their order for the Britannia last October they signed for three aircraft and asked for an option on a further five. In March the firm order for three aircraft was increased to four, the option still remaining at five. The Canadian airline have again increased their fleet by the purchase of an additional aircraft, so that the order now stands at five Mk 314s ordered, with an option on a further five. Deliveries will begin next year for introduction onto C.P.A.L.'s trans-polar route between Vancouver and Amsterdam, at present flown by DC-6Bs.

Jets for "East" Lufthansa?

A CLAIM by Herr Theiler—described as an aviation expert on the staff of the East German Airline—that East Germany might be the first country (other than the U.S.S.R.) to operate a new type of Russian four-jet airliner has been reported. Herr Theiler described the aircraft, which is still in the design stage, as a "turbine airliner with four jet-propulsion units." Carrying 40-60 passengers, it would fly from Moscow to Berlin in two and a half hours, from Berlin to Cairo in four hours, or from Berlin to New Delhi in six hours. [There is an odd disparity in these claims: Moscow to Berlin (1,000 st. miles) in 2½ hr gives a block-to-block speed of 400 m.p.h.; Berlin to New Delhi (about 3,800 st. miles) in 6 hr—presumably non-stop—gives a similar speed of 630 m.p.h.]

U.S. 6th Fleet has Sparrows

FIGHTER aircraft of the U.S. 6th Fleet in the Mediterranean have now been equipped with the Sperry Sparrow guided air-to-air missile. The U.S. Navy is thus the first of the American armed services to put air-to-air missiles into service. It is reported that the Sparrow's accuracy has been demonstrated by "hundreds of launchings against drone targets" and that it can be fired at ranges up to five miles and speeds up to 2,000 m.p.h.

One of the Sparrow-equipped units of the 6th Fleet is Attack Squadron 83 embarked in U.S.S. *Intrepid*. Sparrows are also operated by the U.S. Marine Corps' Night Fighter Squadron 542 based at El Toro, California. Additional units are being converted weekly and the Sparrow itself is being steadily improved. The photograph opposite shows the weapon carried by a Cutlass carrier-borne fighter.

Sir John Boothman joins K.H.

IT is announced by Kelvin and Hughes, Ltd., that Air Chief Marshal Sir John Boothman, K.C.B., K.B.E., D.F.C., A.F.C., F.R.Ae.S., will join their Board on May 1st.

Sir John, who was A.O.C-in-C. Coastal Command before he retired after spending 35 years in the R.A.F., will be remembered particularly for his achievement in 1931 in winning the Schneider Trophy outright for Great Britain. In later years his appointments have included those of A.O.C. No. 106 Photographic Reconnaissance Group Coastal Command; A.O.C. Aeroplane and Armament Experimental Establishment, Boscombe Down; and Controller of Supplies (Air), Ministry of Supply. With Kelvin and Hughes, Ltd., his technical and administrative experience will be utilized in furthering the commercial activities of the company "in the fields of marine and industrial as well as aeronautical instrumentation."

A Notable Cranwell Parade

WHEN the 67th Entry to Cranwell passed out at the College on Tuesday of last week, April 10th, the Chief of the Air Staff, Air Chief Marshal Sir Dermot A. Boyle, K.C.V.O., K.B.E., C.B., A.F.C., was the reviewing officer. Although these parades at Cranwell come round with some regularity, this particular occasion was unique. For the first time in the history of the College the reviewing officer was himself a graduate of Cranwell—and he was also the first graduate to have become C.A.S. In addition to this, he had the proud task of presenting the Sword of Honour to his own son, Sen. U/Off. A. A. Boyle, who was in command of the cadet parade. Another outstanding award-winner was U/Off. T. W. Turnill, who received the Queen's Medal, the J. A. Chance Memorial Prize and the R. M. Groves Memorial Prize.

For once, the weather was good, and the ceremony was watched by Viscountess Trenchard; Air Chief Marshal Sir Ronald Ivelaw-Chapman, the V.C.A.S.; Air Chief Marshal Sir George Mills, C-in-C., A.A.F.C.E.; Air Marshal Sir Harry Broadhurst, C-in-C. Bomber Command, and Air Marshal R. L. R. Atcherley, C-in-C. Flying Training Command. The C.A.S. and Air Marshal Atcherley were wearing in public for the first time the new gold and blue sashes with 11in tassels which the Queen has approved for ceremonial wear by officers of the rank of air vice-marshal and above.

In his address to the parade, Sir Dermot Boyle said that rumours were circulating to the effect that, when the era of push-button warfare arrived, there would be no further work for pilots in the Royal Air Force. The standard answer to this sort of anxiety was, of course, that push-button warfare was still a long way off. This, said the C.A.S., was a most unsatisfactory reply, since it presupposed that, when finally the push-button stage was reached,

***SPARROW-CUTLASS:** This is one of the first photographs released of the Chance Vought F7U-3M Cutlass armed with four Sperry Sparrow I beam-riding missiles. As noted in a paragraph opposite, the Sparrow is now in service with the U.S. Navy in more than one theatre of activity.*

there would indeed be little or no call for pilots; alternatively, it insinuated that the R.A.F. was not anxious to modernize itself and to substitute these weapons for aircraft. Nothing, he said, could be farther from the truth. The R.A.F. was doing all in its power to ensure an ample supply of the very latest and most potent weapons: but, however successful these might be, they could not completely replace aircraft, even in the rôles for which they were useful; and in many rôles they would not replace aircraft at all. The amount of flying that the present cadets and their successors would do would be exactly the same as had been the case in the past, regardless of progress in missiles and other weapons. If some reduction in total flying hours proved necessary, this reduction would only affect those not on the full-career General Duties list.

R.Ae.S. Lectures

WITH the title *High-speed Experimental Test Flying*, a lecture was due to be given before the Royal Aeronautical Society in London last night (Thursday) by Lt.-Col. Charles E. Yeager, U.S.A.F., who in September 1953 flew the Bell X-1A research aircraft at 1,650 m.p.h. Since October 1954 he has served as Operations Officer, Fighter Division, Combat Operations, in Germany and is now with the 50th Fighter/Bomber Wing.

On Wednesday, May 9th, the Society is holding an all-day discussion on supersonic flight, at which four short papers will be presented by Mr. A. V. Cleaver, Mr. P. J. Duncton, Mr. D. J. Farrar and Mr. H. H. Gardner. The date of the lecture by Sir Frederick Handley Page to the Graduates and Students Section of the Society has now been changed by the lecturer from May 1st to May 10th. His title will be *Some Thoughts on Present-day Aircraft and the Future*, and the meeting will be held at 7.30 p.m. at the Society's headquarters at 4, Hamilton Place, London, W.1.

Edinburgh's New Terminal

TRAFFIC through Turnhouse Airport, Edinburgh, has increased more than fourfold during the past four years, and the need for new terminal buildings—the previous ones were shared with the R.A.F.—has been felt strongly, particularly in the summer months. On Thursday of last week, a fine new terminal (see photograph) was opened by the Minister of Transport and Civil Aviation, Mr. Harold Watkinson. The new building is about a quarter of a mile west of the present main airport entrance, allowing complete segregation of civil and military activities. Built at a cost of £84,000, it has been planned to permit extension as passenger traffic demands. The ground floor accommodates the passenger offices and "processing" facilities, from which a stairway rises to a shelf balcony where the bar and buffet are situated. A roof terrace on the first floor will provide airport visitors with a fine view across the airport.

Lympne at Home

A MID-WEEK occasion for club pilots and private owners next month will be an "at home" at Lympne Airport, organized by Skyways, Ltd., on Wednesday, May 16th. Intended for those interested in the flying club movement and in the operation of the aerodrome, the function is the result of a suggestion by Mr. Eric Rylands, Skyways managing director.

The company states that readers of *Flight* who are private-aircraft owners or club pilots will be welcome with their aircraft on this occasion, when they will be entertained to lunch. Those interested should contact Mrs. E. Whittaker, head of public relations (or her assistant, Miss Tipper), Skyways, Ltd., 7 Berkeley Street, London, W.1 (Grosvenor 7721).

***PLEASING ASPECT** of the newly opened terminal building at Turnhouse Airport, Edinburgh, is its wooden panelling. As recorded on this page, Scotland's new facility was opened on April 12th.*

***SKYLARK:** An impression of the Skylark 600, Convair's forthcoming medium-range jet airliner. A comparison between this aircraft and the Comet 4 was made in "Flight" for March 30th.*

STARFIGHTER

Lockheed's Mach 2 Fighter for the U.S.A.F.

By THE TECHNICAL EDITOR

FOR more than two years aeronautical enthusiasts have been eagerly swopping meagre "unconfirmed details" of the Lockheed F-104 supersonic fighter. In conformity with a possibly unrealistic Pentagon decision, its characteristics, like those of other recent U.S.A.F. prototypes, have been a closely guarded secret. Now, however, "the wraps" are off. A Press unveiling was being held in California on Tuesday of this week and there are grounds for believing that at this function an attempt was to be made on the world speed record. A *Flight* representative was present and his despatch will appear in a future issue. This account has been prepared in advance, so that readers can become familiar with the remarkable F-104 at the earliest possible moment.

Fast aeroplanes have always been a *forté* of the Lockheed Aircraft Corporation. America's first real jet fighter was the Lockheed Model 80 (later XP-80 Shooting Star), which was enabled to fly 100 days from the start of design by the generosity of the de Havilland Engine Company, who shipped to Lockheed the only flight-cleared Goblin they had to hand. The Shooting Star went into major production shortly after World War 2 and over 7,000 derivatives have since been built (many powered by turbojets similar to the Rolls-Royce Nene, which, incidentally, was first air-tested in a Shooting Star airframe). During 1947 a large twin-engined fighter was developed to meet the U.S.A.F. requirements for a long-range "penetration" fighter. Designated L.153, or XF-90, two prototypes were flown extensively. It is not generally known that the type was dived beyond the speed of sound, but no production order was placed.

The opportunity for Lockheed to enter the true supersonic lists came in 1951, when the Air Force worked out its specification for an "air-superiority fighter." This concept has changed somewhat in recent years, but can be considered principally as a fighter which can destroy enemy fighters. All-weather capability, long range and ability to operate from forward bases were not requirements of the specification, which was biased in favour of extreme all-round performance and cheap and reliable operation.

Behind the specification lay long, and often heated, discussions with pilots back from Korea. The encounters between Sabres and Migs had served to emphasize the importance of maintaining a high standard of serviceability and reliability throughout all combat operations. A classic example of the Air Force's failure to do so is provided by the A-1CM radar gunsight, which gave so much trouble that Col. Francis Gabreski, a Korean "ace," went on record as saying that he would rather sight his guns with the aid of a piece of chewing-gum stuck on the windscreen.

This state of affairs gradually gave rise to pressure for a smaller, lighter and more reliable fighter which could not only be kept in fighting trim but would also provide a marked increase in all-round performance. American pilots had become heartily sick of looking up at the undersides of Migs, and the lightweight fighter was frequently looked upon as the panacea which would put its owners literally on top.

Some relief was provided by new equipment such as the A-4 gunsight, the "black box" components of which could be removed and replaced in a matter of minutes. The shortcomings in performance were more fundamental and gave rise to the air-superiority concept. Several firms submitted projects, but it was early decided that responsibility for this development would be placed with Lockheed's California division at Burbank, with the Air Force designation F-104. A powerful design team was quickly assembled around Clarence L. ("Kelly") Johnson, the chief engineer. Johnson has never quite subscribed to the idea of a light fighter and certainly not to the concept of a stripped-down aircraft. His opinion, which seems to be common-sense, is that one might get a few top-notch men capable of doing well with such equipment, but that in practice one must design for the run-of-the-mill pilot for whom a "gum-sight" is strictly out.

Initial weight estimates, therefore, came out somewhere near that of a Sabre, but in most other respects the Lockheed design was startling. At the end of 1951 Lockheed knew they would be using a single turbojet with afterburner and it has stayed that way through a large number of projected airframe configurations. The basic design work was immeasurably assisted by the Air Force/N.A.C.A. research with supersonic aircraft, which had obtained aerodynamic data at Reynolds numbers appropriate to the F-104 at up to 90,000ft and Mach 2. Lockheed also ran several thousand hours in their own tunnels and in the Southern California Co-operative Tunnel, in which they have a one-sixth share.

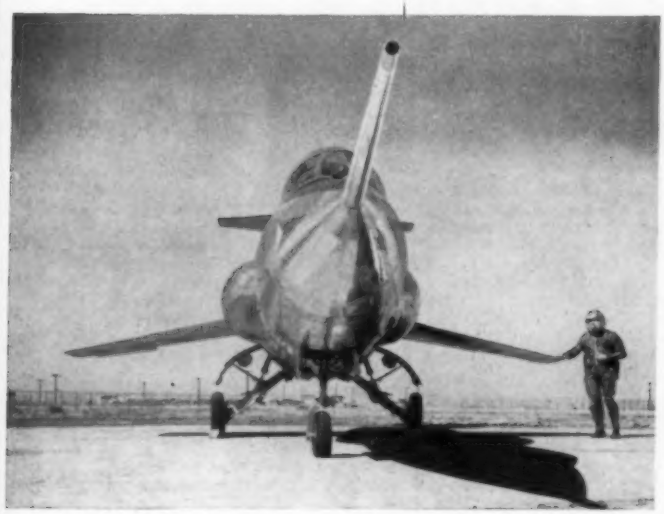
In the F-90 the company made some use of ballistic models dropped from high altitude, but the terminal velocity thus attained was insufficient for the new fighter. Free-flight work entailed the use of vehicles fitted with F-104 aerodynamic surfaces and launched from ramps in the desert under the thrust of 5in rocket motors. Data were also obtained from existing aircraft embodying components expected to be designed into the future fighter. Assistance was given by the N.A.C.A. and Cornell with variable-stability aircraft capable of simulating the behaviour of the F-104.

One of the first design choices was the type of wing to use. After looking extensively at other wings, the company settled upon a true supersonic aerofoil with very low aspect-ratio, no sweep-back and the unprecedented thickness/chord ratio of 3.4 per cent. No other aircraft, then or since, has had so thin a wing, and Lockheed's firm determination to employ such an aerofoil can only be regarded as courageous. In passing, we remember that Johnson was once introduced as a member of the fraternity "No Delta Wing."

As in most missiles, virtually everything had to be put inside the fuselage, which, at the same time, had to be of minimum frontal area with a profile suitable for high supersonic speeds. Lockheed were well aware of the N.A.C.A. area rule, but transonic interference drag was never a problem with the 104. Area rule is less applicable to "wholly supersonic" aircraft, and in any case the Lockheed fighter's wing volume is exceedingly small.

Fuselage design was complicated by the overriding importance of obtaining optimum flow into, and out of, the turbojet—particularly when, as in this case, the engine was to develop half its maximum-speed thrust as a ramjet. Supersonic-intake design is an exceedingly complex subject which Lockheed and the N.A.C.A. had to explore thoroughly. With a modern axial engine most of the trouble is likely to occur at the top end of the speed range. It is essential to get rid of the boundary layer and singular importance also attaches to the manner in which this is accomplished. Boundary-layer growth is usually a function of fuselage length ahead of the intake, and so it is remarkable that Lockheed believe they have attained a better inlet-air distribution than in any other aircraft now flying.

The aircraft above is one of the 17 prototypes powered by the Wright J65-W-3 Sapphire. That shown below and opposite is the first J79-powered machine and it is noteworthy that the intakes have been blanked off with metal sheet, presumably owing to a change in design which is still regarded as secret. There is no evidence of armament on either of the aircraft illustrated in these pages. The Starfighter is, however, considered as ready for release to the U.S. Air Force and will enter service with Tactical Air Command in the very near future.



It is possible that a special form of nose intake would have been employed had it not been for a remarkable armament which the Air Force specified. Apart from the homing air-to-air missile, the only type of weapon capable of employment in supersonic combat was considered to be a gun capable of placing many strikes on a target in firing periods measured in fractions of a second. To achieve this object, General Electric evolved something like a hot-rod development of the Gatling, known as Project Vulcan. This "firing mechanism" hurls 20 mm shells from multiple barrels, each of which is in a different part of the firing cycle at any given moment. An account of a test firing was published in our special armament issue dated January 28th, 1955. Vulcan was tailored to fit the nose of the first type of F-104A, forming a single murderous package firing 20 mm ammunition at a rate of several thousand rounds per minute. Total firing endurance *per mission* is probably of the order of five seconds.

Of particular interest to British readers is the fact that the early life of the 104 was linked to a British engine. In 1952 only the Armstrong Siddeley Sapphire, as the Wright J65, promised to form a satisfactory afterburning powerplant capable of fitting the space envelope of the F-104.

Nevertheless, even this engine almost completely filled the available space, and Lockheed had to be very clever in finding room for sufficient fuel. Their solution almost gives the impression that they poured fuel all round the intakes, ducting and powerplant and then sealed it up in fireproof bays. The F-104 fuselage carries more fuel than did the twin-engined Lightning long-range fighter of World War 2, and Lockheed are able to describe the 104 as having range "comparable to that of present operational jet fighters."

In some respects it is unfortunate that provision has to be made for a human pilot. Even though he wears a T-1 partial-pressure suit, his cockpit has to be pressurized and air-conditioned, and means must be provided for his escape in emergency. Lockheed found that the optimum escape arrangement was to employ an automatic downward-ejection seat (already used on S.A.C. bombers but not in any production fighter) which not only eliminated the possibility of the pilot hitting the empennage, but permitted a simpler canopy and better cockpit design. Lockheed carefully studied the capsule concept, but concluded that, on balance, the best pod was the airframe itself. An incidental advantage was that, during ground servicing, the escape hatch could be removed and the seat slid out to provide stand-up working space in the cockpit.

Maintenance requirements received particular attention, and a typical example of the way this problem was tackled is provided by the "integrated electronics system." Virtually all the radio and "operational" electronics are packaged into readily removable units, the idea being carried to its logical conclusion by the evolution of several standard arrangements, each suited to the electronic requirements of a particular mission. Another aid to servicing is the grouping of all the centralized hydraulic components on the inside of the large access door under the engine compartment.

At present the F-104 has a conventional undercarriage, with tiny tyres inflated to approximately 300 lb/sq in. Each main leg is a forged cantilever hinged along an oblique axis to one of the main engine-support frames. The leg is also hinged along a horizontal axis to enable it to deflect outwards under landing loads under the restraint of a vertical shock-strut. Each unit retracts forwards hydraulically into bays closed by two doors on each side, each rear door being linked to its appropriate leg. Anti-skid, multi-disc brakes are used, the static discs being restrained by external torque links. The steerable nosewheel likewise retracts forwards into an unpressurized box sealed by twin doors. Landing lights and taxying lamps are mounted on the nose leg and inside the main-wheel doors.

Owing to the high bending moments in the wing—which, as a result of the extreme thinness, generate unprecedented root stresses per foot run of chord—it looked at one time as if Lockheed would have to make the wing as a single slab from tip to tip. This in turn dictated a low wing-position in order to clear the crowded fuselage interior. As the design progressed it was found possible to make the fuselage frames strong enough to take out all the wing loads, each semi-wing being cantilevered, missile-fashion, from the fuselage. It has thus been possible

STARFIGHTER . . .

The shape of the Starfighter — this is a J79-powered F-104A—appears unusual to eyes accustomed to subsonic airframes, but will become quite familiar and acceptable during the forthcoming decade.

to adopt a mid-wing arrangement with something like a 12 per cent reduction in drag over that of the low-wing project.

Each half-wing projects from the fuselage mould line rather less than eight feet. As this is approximately the same as the height of the vertical tail above the fuselage, the rudder has considerable influence on rolling behaviour and tends to act as an aileron. This fact was counteracted by giving the wing ten degrees of anhedral. The short span is inevitable (in the present state of the art) wherever the thickness/chord ratio has to be so low. Such wings are, in any case, the optimum form for the high-supersonic regime in which the F-104 ideally performs, where considerations of induced drag cease to have their subsonic importance.

At lower speeds, however, the old $\frac{W}{b^2\rho}$ formula applies stringently and, as the 104 has greater span-loading than any other combat aircraft, induced drag becomes serious towards the lower end of the speed range and particularly acute at high altitudes. This fact must tend to put the 104 in the unfortunate class of aircraft where enormous "island performance" exists at high altitude and high supersonic speed, but where the medium-altitude, medium-speed conditions leave little in hand for climb and acceleration. At present, however, the F-104A (without external stores) can get through to the upper limits of speed and altitude in a matter of a few minutes.

In order to improve wing behaviour at high angles of attack, the leading edge can be drooped some 20 deg. This feature significantly reduces airfield requirements and should make it possible to fly controllably at full load at roughly 200 kt. Incidentally, the leading-edge drooping mechanism is accommodated in a maximum interior depth of less than 2in, which is no mean feat. The supersonic profile of the wing is complex, involving flats and smooth curves joined by a 0.016in nose radius and a knife-edge at the rear. Such a profile can generate high lift at low angles of attack and, with the leading edge drooped, can reach reasonable lift coefficients, although in this respect it cannot match subsonic wings. Wing loading on the Starfighter is naturally considerable, but it should not be forgotten that even at low speeds the fuselage generates substantial lift. Jettisonable tanks, each carrying 200 U.S. gallons, can be fitted over the wing tips like gloves. Although these tanks increase supersonic interference drag, they exert a beneficial end-plate effect equivalent to an increase in span. Spanwise flow on a straight wing is not worth worrying about, so no fences are required.

In some respects the control system is remarkably conventional. Moments of inertia in supersonic aircraft are usually much larger in yaw and pitch than in the rolling plane, and cross-coupling between these moments in an F-100 took the life of George Welch, engineering test pilot of North American. N.A.A. distributed the results of the ensuing investigations throughout the U.S. industry and this may have saved Lockheed from similar trouble by warning them to include second- and third-order terms in their calculations. The upper limits of altitude and airspeed of the F-104 have yet to be matched by any other combat aircraft.

Rolling control is effected by large-chord, small-span gapless ailerons, operated hydraulically without tabs. Control in the pitching plane is provided by a slab tailplane hinged at its mid-chord point near the tip of the fin. In this position it forms a useful end-plate, and Lockheed reckon the 104 fin to be approximately twice as effective as equivalent areas on other fighters. Structural problems in the tail were considerable, but any other arrangement would have placed the tailplane in fluctuating downwash and shock waves.

With a thin straight wing the aircraft c.g. needs to be forward of 20-per-cent-chord. As the c.p. travels aft in the transonic regime a considerable nose-down pitching moment is introduced, which must be counteracted by a downward force on the tailplane. This is just what the 104 does not want, particularly when combined with a marked reduction in C_L of the wing. One might suppose that, had Lockheed had more time to think in the early stages, they would have gone for the canard layout, i.e. with a nose-plane. Another advantage of such a layout could be that the lack of downwash on the present tailplane results in its experiencing pure drag, instead of—under some conditions with low tailplanes—forward thrust. Inboard of the ailerons are large-chord split flaps; in addition air brakes are hinged on each side of the rear fuselage and a ribbon braking parachute is located in a box under the afterburner.

Throughout the structural design one can detect Lockheed's efforts to evolve an airframe capable of cheap and rapid production. The wing is machined all over, much of the structure being of steel—not only on grounds of kinetic heating, for with a wing like this the use of light alloy places too much of the material too close to the neutral axis to do much good. Control surfaces and access doors are conventional sheet assemblies stabilized by a filling of Lockfoam. Parts of the skin are integrally stiffened. Lockheed claim that the F-104 airframe costs roughly half as much as do the structures of its contemporaries, this being partly due to the fact that it is only half as heavy.

Flight Trials

During 1953 Lockheed received orders for 17 prototypes, each a little more advanced than its predecessor, the last examples being virtually to production standard. All were built in production tooling, following the "Cook-Craigie plan" to the letter. The first prototype XF-104 was taken by road to Edwards A.F.B. early in 1954 and flew there on February 7th of that year. The pilot was A. W. ("Tony") LeVier, Lockheed's director of flying operations. This XF-104 has logged over 300 experimental flights and many hundreds of hours on the 17 prototypes have now been flown from both Edwards and the Air Force Jet Center at Palmdale.

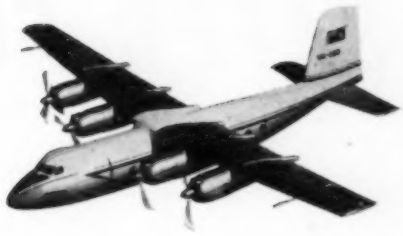
As had been anticipated, the 104 needs plenty of space in which to get airborne, for, even with the leading edge drooped, the wing is by no means an optimum aerofoil in the take-off regime. Nevertheless, with an afterburning thrust/weight ratio of better than unity, a run of 4,000ft puts the speed well over 200 kt and, once in the air with the gear tucked away, the 104 becomes an extremely clean aeroplane.

To Tony LeVier, Herman R. ("Fish") Salmon—the chief engineering test pilot—and their colleagues, their supersonic charge was no mean responsibility, although long hours spent in the mock-ups before the first flight made them less unnerved by the gleaming projectile than they might have been. Their work was arduous, although by British standards development has been rapid—such is the advantage of pulling out one prototype after another.

Thus it was that, over a year ago, air-firing trials were already in progress. By this time Phase I testing was virtually complete and the J65-powered aircraft had been investigated over its complete design Mach spectrum; but trouble struck during high-speed firing runs, when an expended shell-case was sucked into one of the intakes. Here it refused to follow the duct into the engine (which it might have wrecked) but plunged through the wall into a fuselage tank. Luckily the hot case did not blow up the tank; but fuel streamed from the puncture and swamped the engine. The result was a skilfully-executed, dead-stick landing at Edwards without further damage to the aircraft. The pilot was LeVier.

One prototype was, however, lost. This occurred later in

Heralds **would improve the picture**



in Australia's Northern Territory

Up on the Barkly Tablelands getting about is not always easy. Moving goods across this cattle-breeding region is no joke over roads that—where they exist—are sometimes unusable in bad weather.

Some people are lucky enough to live near "the bitumen," the war-time built all-weather highway. But, by car or on horseback, journeys can be tedious in the extreme. As for catching a train, this stockman is hundreds of miles from the nearest railway.

It is just as well that air communications are good. All the same, few big modern 'planes able to land at, say, The Alice or the prosperous gold-mining town of Tennant Creek can serve the smaller airfields of the Northern Territory and carry their varied passenger and freight traffic.

Heralds could do so more efficiently than any other aircraft. They are sturdy, comfortable and versatile and carry nearly a five-ton payload.

for 9 good reasons

- **Safety: four-engined assurance with full load.**
- **Reliability: strongly and simply built for long life and easy maintenance.**
- **Performance: meets world-wide flight requirements with a clear margin in hand.**
- **Versatility: passengers, freight or a mixed load up to 10,500 lb.**
- **Economy: costs 1½d. a passenger-mile and 1/3½ a ton-mile to run.**
- **Small Airfields: can take-off with full payload from 1,000-yard grass landing-strips.**
- **Cruising speed: 200 m.p.h.**
- **Pressurisation: efficient and comfortable travel up to 20,000 ft.**
- **High wing: easy loading and a good view for passengers.**

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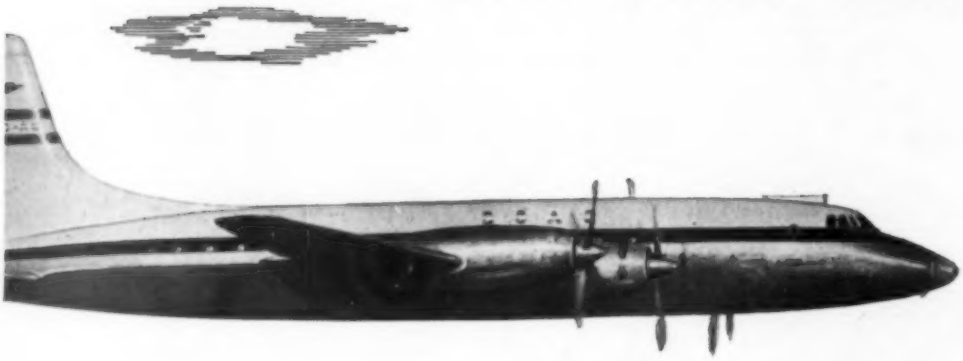
EKCO AIRBORNE SEARCH RADAR



EKCO are pioneers in the development of Airborne Search Radar which has been selected for installation in leading aircraft including the entire fleet of Bristol 'Britannias'. This equipment not only makes flying safer by giving pilots up to 40 miles warning of cumulo-nimbus clouds and high ground, but also provides the navigator with map-painting facilities. Special features of this 3-cm equipment are iso-echo contour circuits and high brightness display.

EKCO electronics

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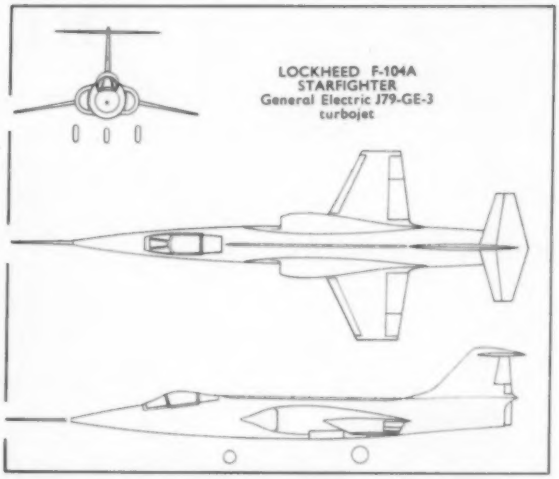
STARFIGHTER . . .

1955, when Salmon suffered unspecified trouble while flying near the tropopause over rugged Sierra-type country. Any attempt to ride the 104 down would have been suicidal, so "Fish" baled out at about 15,000ft at under 300 m.p.h., eventually to be picked up by helicopter. It is recorded that, when frantic company engineers finally reached him by telephone, he asked imperturbably, "Why, what happened?"

About a year ago it was clear that the production version would have a new engine. This was in no way due to dissatisfaction with the J65, but arose from successful bench trials of a truly remarkable turbojet which G.E. were preparing up at Evendale. Designated J79, this engine has a single axial compressor, of high pressure-ratio, incorporating several variable-pitch rows of stators. The resulting combination of performance, specific thrust, light weight, handling characteristics and efficiency (in both subsonic and supersonic flight) is of an altogether exceptional nature.

The F-104 fitted this paragon of virtue like a glove, the only external changes being larger intakes of modified profile and a fatter rear fuselage to accommodate the J79 afterburner; in addition an extra bay was inserted into the fuselage behind the cockpit to provide increased tankage. In spite of the startling advance in performance conferred by this engine, the miles-per-gallon remain roughly the same as with the J65. Under some conditions thrust exceeds weight and the maximum rate of climb is obtained at maximum forward speed. It is officially stated that, so far as can be determined, the J79-powered machine (designated F-104A Starfighter) is the fastest climber in the world. LeVier once commented on the effects of doing levels at 30,000ft and then zooming to 70,000ft in a matter of seconds; and there seems no reason why, at full speed, such a height should not be maintained.

In parentheses, it is worth recalling that Marquardt have developed a tip-mounted supersonic ramjet which, at the start of each mission, can be faired over and used as a tank. Such an arrangement would fit the 104 particularly well; Marquardt subsonic ramjets were once so disposed on a Lockheed F-80. Ramjet boost may well be in hand for the 104, but it would seem to be a case of gilt-on-the-gingerbread, for if the 104A needs more thrust anywhere, it is at Mach 1 and not at Mach 2.



Many pilots from the U.S. Air Force have now flown the 104 and conversions will be facilitated by the dual-control TF-104. Tremendous production of the 104A is building up rapidly—a characteristic of the Cook-Craigie plan, since the aircraft need no modifications whatever. Squadrons will be formed in Tactical Air Command in a matter of weeks.

In service the 104A will be sufficiently flexible for Lockheed to have made provision for "quick-change acts" between missions, and a great variety of stores—not excepting atomic weapons—can be carried externally. Announced roles include day or night interception, tactical interdiction and support, photo-reconnaissance and ground-attack. The present F-104A is fitted with a radar gunsight but not with search radar. Work is well advanced on an all-weather intercepter for Air Defense Command, probably armed with Falcon missiles. With their own money Lockheed built a two-seat prototype to serve both for this aircraft and for the trainer, and a two-seat "tactical fighter," designated F-104B, is already in production.

What then will the present F-104A do? It will fly extremely fast, and at Mach 2 will have tremendous altitude capability, although at lesser speeds its ceiling and other aspects of performance will markedly deteriorate. This raises an anomaly. With gun armament the human pilot can never fight at Mach 2 with a radar gunsight alone, irrespective of what ground control may be provided; and to attack a target moving only half as fast, the 104 must slow up considerably and depart from its best operating regime. Laying guns on a target may well be very difficult even if, as one might suppose, the barrels are spread to give a blanket of fire. Certainly the 104 will give its pilots tremendous moral ascendency, especially in a "cold war," but its defensive role seems uncertain unless the human element can be removed from the interception procedure.

Flying the Starfighter will have a glamorous attraction, but it may be found that mechanical trouble will result in a high wastage of either aircraft or pilots. Failure of the 104's single engine could be serious. In a power-off approach the airspeed could hardly be less than 300ft/sec; and, even with the leading edge drooped, the gliding angle could scarcely be flatter than 1 in 5, which gives the quite unreasonable vertical velocity of 60ft/sec. Provision must also be made for failure of the wheel brakes or brake chute in otherwise normal landings.

It seems, therefore, that this aircraft will rarely make a power-off landing in service and will also be somewhat restricted as to choice of airfields. It may, in consequence, frighten its pilots; but it will certainly frighten its enemies.

Although the F-104 has a theoretical 60,000 h.p. supported by a 22ft wing, it is a very tractable aircraft and one Lockheed pilot has even gone as far as accelerating through Mach 1 with his hands clasped behind his head. This is one of the prototypes, with tip tanks in place.

LOCKHEED F-104A STARFIGHTER

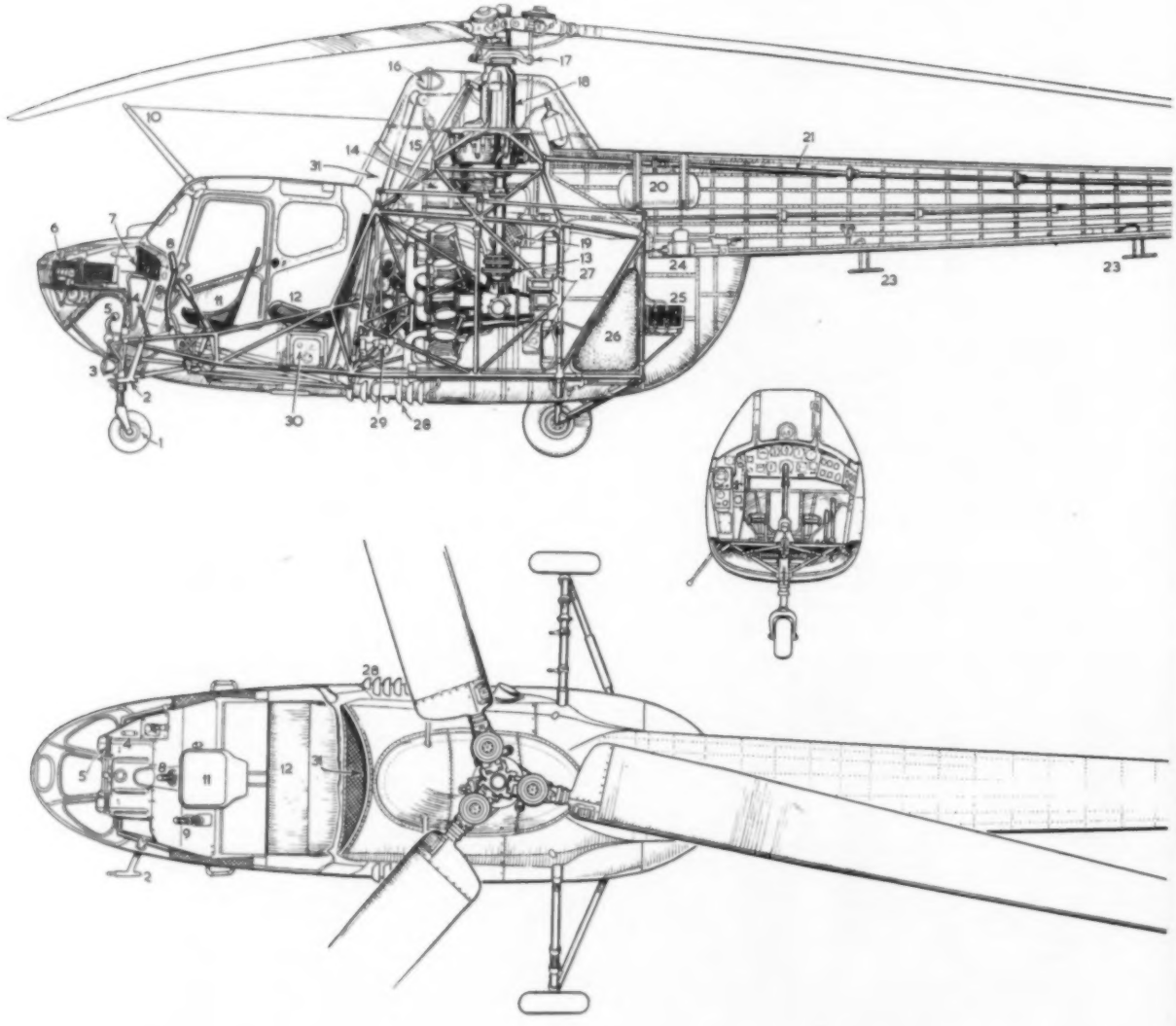
General Electric J79-GE-3 turbojet, rated at 12,000 lb dry and giving over 16,000 lb thrust with afterburning to more than 1,800 deg K.

Span, without tip-tanks, 21ft 11in; overall length, 54ft 9in; height to fin tip, 13ft 6in; approximate net wing area, 111 sq ft; approximate tailplane area, 45.5 sq ft; approximate area of vertical tail, 40 sq ft; maximum weight, 15,000 lb, with over 17,000 lb in prospect for future operations.

Maximum speed on the level or in up to about 20 deg climb, more than M=1.85; operational ceiling, more than 65,000ft; radius of action, about 500 miles at the tropopause.

THE Mi-1

First Disclosure of the Technical Characteristics of a Russian Helicopter



THREE-TO-FIVE-SEAT helicopters are at present in widespread use all over the world as main utility types. In the U.S.S.R. helicopters of this class are exemplified by Mi-1 designed by Mikhala Milla.

This helicopter has now been used since 1951 for a variety of duties, including postal service, communications, ambulance, rescue, liaison, air inspection of high-voltage cross-country transmission lines, etc., in various regions of the Soviet Union in many southern and northern republics. Constructional layout of the helicopter is of typical Yuriev configuration. The fuselage contains the cockpit, powerplant, fuel and accessories, with a tail boom attached to it.

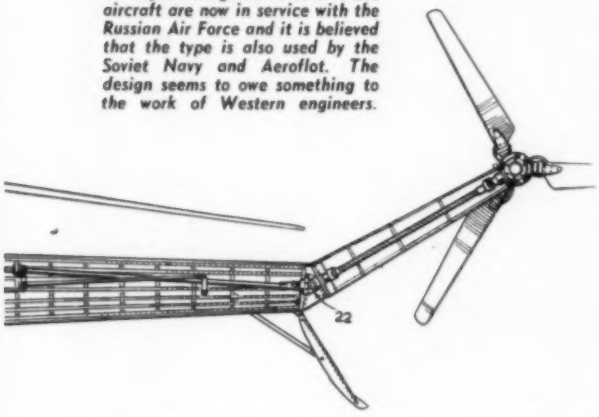
From the constructional point of view the fuselage and the tail-boom are of completely different design. The fuselage is a tubular frame to which covering metal skin is attached, whereas the tail-boom is a conical structure of semi-monocoque design, with rings and longerons. Undercarriage legs, with oleo-pneumatic shock absorbers to all three wheels, are fitted to the joints of the fuselage frame, the nose wheel being steerable.

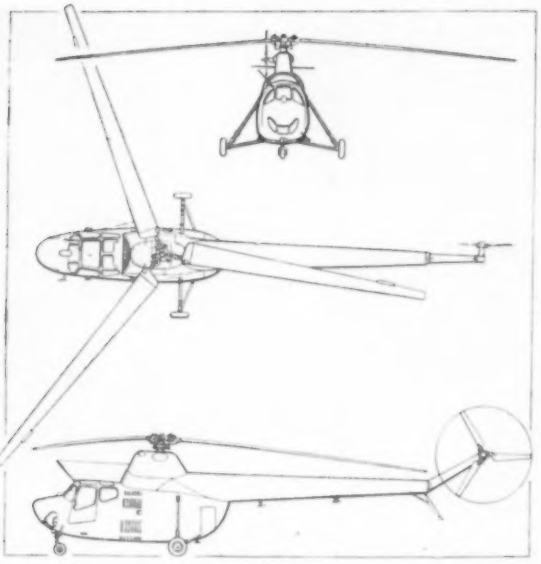
In the cockpit is a pilot seat and a bench for three passengers. Flying controls, including cyclic- and collective-pitch levers,

THE Tu-104 and Mig-15 excepted, reliable structural details of Russian aircraft are hard to come by. We have therefore prepared drawings, and a direct translation, from a description of the Mi-1, a helicopter comparable with the Sycamore or Dragonfly. The overall progress made by Russia in the helicopter field is extensive. In addition to this comparatively modest aircraft, large numbers of more capable machines are already in service. One of these, with the Western code-name "Hound," resembles the S-55; another, code-named "Horse," is generally similar to the Bristol 173. A "Horse" recently lifted two metric tons to 5,082 m (over 16,000ft) and 4 metric tons to over 2,000 m.

throttle, brake and clutch levers are adjacent to the pilot's seat, in front of which is situated the instrument panel. On the latter are placed all the flying and navigational instruments, engine-speed indicators and all the change-over switches of the electrical and radio system. Radio equipment itself, including receiver and transmitter, is fitted in the extreme nose, except for the inverter and radio [illegible] which are placed at the rear of the main fuselage. [illegible]rial is stretched over the roof and radio-altimeter aerials are situated under the tail boom. The importance of the radio-altimeter cannot be over-estimated since it enables landings to be made in very bad visibility. Large glazed panels

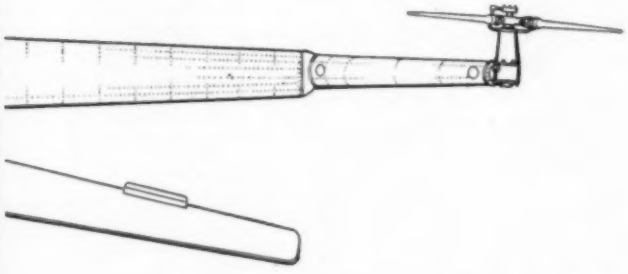
A "Flight" artist has prepared this cut-away drawing and three-view general-arrangement of the Mi-1 helicopter. Large numbers of these aircraft are now in service with the Russian Air Force and it is believed that the type is also used by the Soviet Navy and Aeroflot. The design seems to owe something to the work of Western engineers.





Mi-1 helicopter (540 h.p. ASZ-21 seven-cylinder radial).—Main-rotor diameter, 48ft 5in (14·8 m); overall height, 13ft 4in (4·1 m); maximum weight, 4,938 lb (2,240 kg); maximum forward speed, 102 to 108·4 m.p.h. (165 to 175 km/hr); normal range, 398 to 450 st. miles (640 to 725 km).

1 Nosewheel.
2 Pressure head.
3 Taxying lamp.
4 Clutch lever.
5 Tail-rotor pitch-control pedals.
6 Radio transmitter/receiver.
7 Instrument panel.
8 Cyclic-pitch lever.
9 Collective-pitch lever.
10 Aerial.
11 Central pilot's seat.
12 Bench-type passenger seat.
13 Rotor brake.
14 Oil tank.
15 Collective-pitch linkage.
16 De-icing fluid tank.
17 Control spider.
18 Main gearbox.
19 Oil cooler.
20 De-icing fluid tank.
21 Tail-rotor shaft.
22 Tail-rotor intermediate gearbox.
23 Radio-altimeter aerials.
24 Inverter.
25 Radio-altimeter transmitter/receiver.
26 Fuel tank.
27 Compressed-air bottles.
28 Cooling-air outlet.
29 Compressed-air starter.
30 Battery.
31 Cooling-air intake.



ensure excellent visibility for both the pilot and the passengers.

The engine (an ASz-21 seven-cylinder, single-row radial specially converted for helicopter use, with fan cooling and developing a maximum of 540 h.p.) is at the back of the cabin and separated from it by a fireproof wall. Cooling air is taken in through an inlet above the passenger cabin. With the horizontal position of engine the drive to the rotor is taken through an angle gearbox on which a clutch and main-rotor brake are mounted. The output shaft connects directly to the main gearbox, which is of the double-pinion type and reduces the speed to some 250 r.p.m. as required by the main rotor. From the same gearbox a drive is taken *via* a transmission shaft to the tail rotor, the shaft being supported at three points along the tail boom. Two further reduction gears (intermediate and final) are interposed between the main gearbox and the tail rotor, the housing of the intermediate box being used as a structural element connecting the main tail boom with its upswept rear portion.

Three blades, of mixed construction, are used in the main rotor. Articulated blades are connected through hinges and have two degrees of freedom, for movements in axial and horizontal planes respectively, horizontal oscillations being damped by special friction dampers. Change of incidence angle is affected by the main-rotor spider, its up-and-down movement covering the collective pitch. To prevent the transmission of oscillations from the main-rotor blades to the controls, inertia dampers are included. The three blades of the tail rotor are hinged to the hub, their pitch being controlled by toe pedals.

A special point worth mentioning in connection with the Mi-1 is its suitability for flights in icing conditions. Anti-freezing liquid is then continuously spread over the main and tail rotor blades and windscreen. Powerful searchlights are fitted for night work.

FORTHCOMING EVENTS

Apr. 23-May 4. British Industries Fair, Castle Bromwich and Olympia.
Apr. 24. R.Ae.S.: Section Lecture: "Development of Helicopter Transport," by R. H. Whitby, B.Sc., A.R.C.S., D.I.C., A.F.R.Ae.S.
May 3-4. Canadian Aeronautical Institute: A.G.M., Montreal.
May 3-5. Institute of Welding: Spring Meeting.
May 9. R.Ae.S.: All Day Section Lecture on Supersonic Flight. Speakers: A. V. Clearer, F.R.Ae.S.; P. J. Duncton, B.Sc., D.I.C., A.F.R.Ae.S.; D. J. Farrar, M.A., A.F.R.Ae.S.; H. H. Gardner, B.Sc., F.R.Ae.S.
May 11. Helicopter Association: Film Show presented by G/C. R. N. Liptrot, C.B.E., B.A.
May 12. Surrey Flying Club: Anniversary Party.
May 12-14. Channel Islands Aero Club: International Rally.
May 15. R.Ae.S.: Section Lecture: "Medical Aspects of Flight Comfort and Efficiency," by Dr. A. Buchanan Barbour, O.B.E., M.R.C.S., L.R.C.P., F.R.Ae.S.
May 17. R.Ae.S.: The 44th Wilbur Wright Lecture, by Sir William S. Farren, C.B., M.B.E., F.R.S., F.R.Ae.S.
May 17-19. F.A.I. Conference, Vienna.
Sept. 3-9. S.B.A.C. Display, Farnborough.

R.Ae.S. Branch Fixtures (to April 30):

Apr. 23, *Halton*, Film. Apr. 24, *Belfast*, A.G.M.; *Boscombe Down*, "Some Developments in Turbine Engines," by Dr. S. G. Hooker. Apr. 26, *Bristol*, A.G.M. and Film Show. Apr. 30, *Halton*, Junior member's paper.

TURBULENT PROGRAMME

AMONG the aerodromes scheduled for visits to date by the French Druine Turbulent ultra-light F-PHFR, on its demonstration tour of this country, are Elstree, Stapleford Tawny, Luton, Cambridge, Denham, Fair Oaks, White Waltham and Hatfield. The provisional programme for the remainder of its stay is as follows:—

Friday, April 20th, Reading (Woodley); Saturday, April 21st, Portsmouth, Eastleigh, Bembridge; Sunday, April 22nd, Elstree (participating as defending aircraft in Elstree Flying Club's Tea Patrol and At Home); Friday, April 27th, Cranfield, Coventry (Baginton); Saturday, April 28th, Birmingham (Elmdon), Manchester (Barton); Sunday, April 29th, Derby (Burnaston), Leicester East, Northampton (Sywell), Elstree; Tuesday, May 1st, Bristol (Filton); Friday-Sunday, May 5-7th, Croydon, for return flight to Paris.

The Popular Flying Association state that the programme of visits to the various clubs and groups, and the departure date, are dependent on weather conditions. Where possible, those wishing to see the Turbulent should confirm its movements either with the local club or at Elstree Aerodrome (Elstree 3070), where the aircraft is based.

HERE AND THERE

Seamew in Jugoslavia

RECENTLY back from a successful tour of Italy, a Short Seamew is due to make demonstration flights in Jugoslavia. Piloted by S/L. W. J. Runciman, it is being shown to the Jugoslavian Air Force at Zadar Air Force Station near Split. Last month Shorts flew a Seamew to Rome, where it was based at Guidonia military airport and flown by Italian Service pilots.

At the Milan Fair

AN Orpheus turbojet is among exhibits on the Bristol Aeroplane Company's stand at the Milan Fair, which opened on April 12th. Power unit of the Fiat G-91 light fighter ordered by NATO, the Orpheus was the subject of an agreement signed last December by Fiat and Bristol, providing for technical collaboration on turbojet engines. It gave Fiat first refusal for a licence to manufacture the Orpheus and engines developed from it.

Satellite Contractors

FOUR sub-contractors for the Project Vanguard earth-satellite launching vehicle have been named by the U.S. Navy and Martin. The Grand Central Rocket Co., and the Allegany Ballistics Laboratory (the latter operated by the Hercules Powder Co.) are to design and develop the third-stage rocket; the Minneapolis-Honeywell Regulator Co. will design and build the three-axis gyro system for the rocket complex; and Vickers, Inc. will design and manufacture the magnetic amplifier autopilot which will take its instructions from the gyro reference system.

European Vanguard?

THE Italian Rocket Society is to suggest to European nations that they sponsor an earth-satellite programme. The proposal will be made at the annual convention of the International Astronautical Federation, to be held in Rome in September. Representatives of 20 countries will attend the one-week meeting, at which special attention will be given to the problems of space jurisdiction. Other subjects to be discussed at the meeting are the technical aspects of the American satellite project and the possibilities of manned flight to the moon.

CELEBRATING the anniversary of the foundation of the Indian Air Force in London are seen (left to right) G/C. E. C. Passmond, S/L. Hermon, Col. Anatoli M. Konstantinov (Soviet Military Air Attaché), and S/L. Anano. Col. Konstantinov is a comparative newcomer to England.

SUPERSONIC RAMJET test vehicle, designated ST-450: this is a S.N.C.A.N. product, accelerated to high supersonic speed by booster rockets, and climbing through Mach 1 on its own ramjet power.

NEWEST JET TRAINER is this Temco Model 51, having a span of just under 30ft and powered with a Continental YJ69-T-9 turbojet of 920 lb thrust. Estimated maximum speed is 345 m.p.h. at 15,000ft.

Looking Forward

BELGRADE RADIO said recently that the Jugoslav Air Force is expecting delivery of a number of American jet fighters under the U.S. Military Aid programme.

Anglo-French Rally

THE Swansea and District Flying School and Club are organizing a Franco-British ball, to be held in Swansea next Friday, April 27th. It is to be followed by an air rally at Fairwood Common airfield on the Saturday. Several well-known French private pilots are expected, and it is hoped that the Druine Turbulent, which is making its demonstration tour in England, will attend.

Bristol Mexican Subsidiary

A MEXICAN subsidiary of the Bristol Aeroplane Co. of Canada (1956), Ltd., has been formed at Mexico City Airport, where it will operate as an engine overhaul base similar to Bristol overhaul and repair plants already established in Canada. The new company is named Bristol de Mexico S.A. de C.V. Directors are Mr. R. J. Reynolds, president; Mr. B. A. Chalmers, vice-president; Mr. J. A. Anderson, vice-president and general manager; and Mr. J. N. Dalton. Two Mexican members of the board are also to be nominated. Mr. J. A. Anderson is at present assistant manager, engineering, Bristol Aero-Engines, Ltd., Montreal.

Wheel, Shutter, Tiller

SPORTS CAR enthusiasts are specially catered for in an enlarged number of *The Autocar*, published today, April 20th. Features include an illustrated review of the world's leading sports cars, descriptions of performance-improving equipment, handling impressions of the Aston Martin DB3S, a road test of the Sunbeam Rapier and an analysis of a well-known high performance engine, the Coventry Climax. A special number of another journal, *Amateur Photographer*, appearing next Wednesday, April 25, will hold interest for all keen photographers: it will be the annual Outdoor Number. Also current is the annual Fitting Out Number of *Yachting World*, containing practical information to help the yachtsman to get the best out of the season's sport.

VICKERS
VISCOUNT
FOUR ROLLS-ROYCE DART PROPELLER-TURBINE ENGINES

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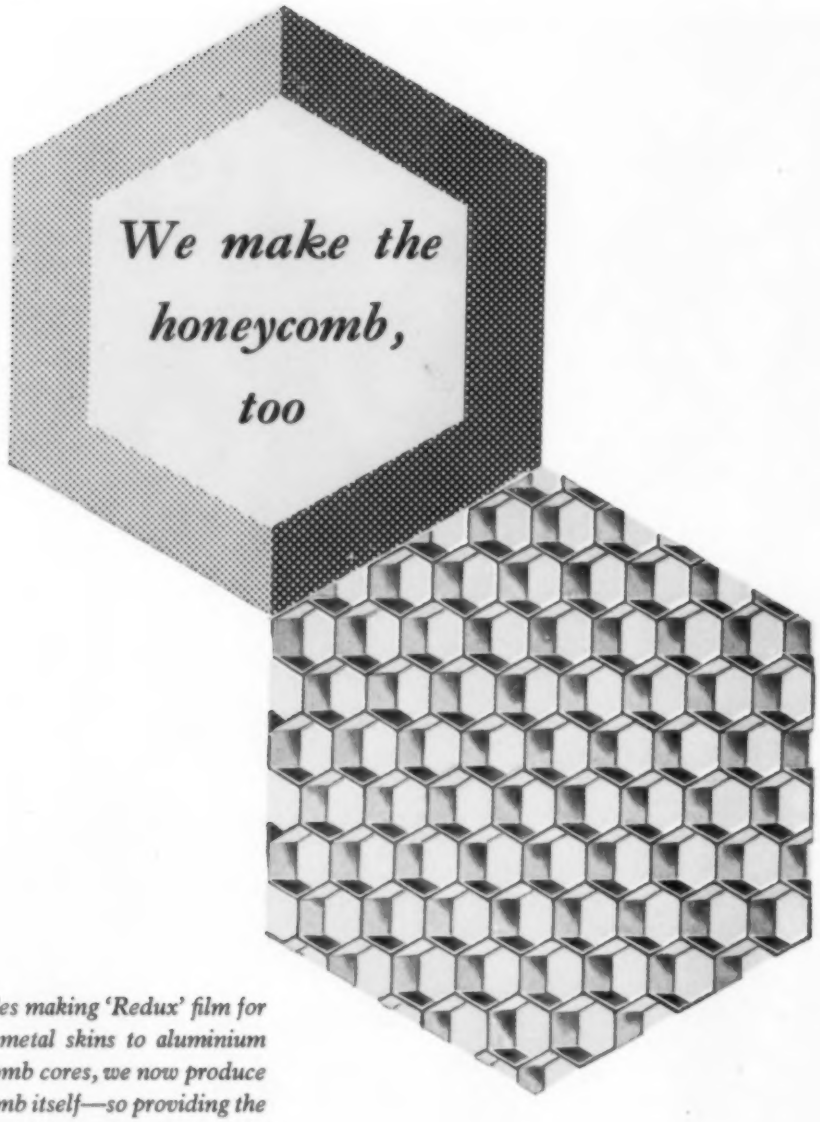

Besides making 'Redux' film for bonding metal skins to aluminium honeycomb cores, we now produce honeycomb itself—so providing the essential components for the modern "sandwich" construction.

Honeycomb can be used for structures of constant or tapering thickness and for shapes involving single or double curvatures. Aero Research honeycomb is supplied in cell sizes of $\frac{1}{8}$, $\frac{1}{4}$ and 3/16in. inscribed circle, each available in wall thicknesses of .001, .002 and .003in. It is made in a range of different depths.

Our seventeen years' experience of honeycomb structures is at the disposal of designers and production engineers. Honeycomb information sheets will be sent gladly on request.

HONEYCOMB CORE

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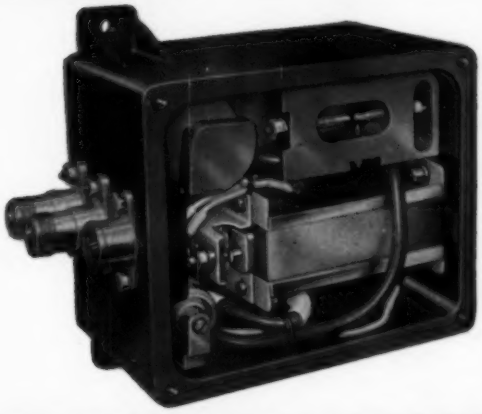
h.f. ignition by



Napier Plessey H.F. Ignition Unit Mark 8.8

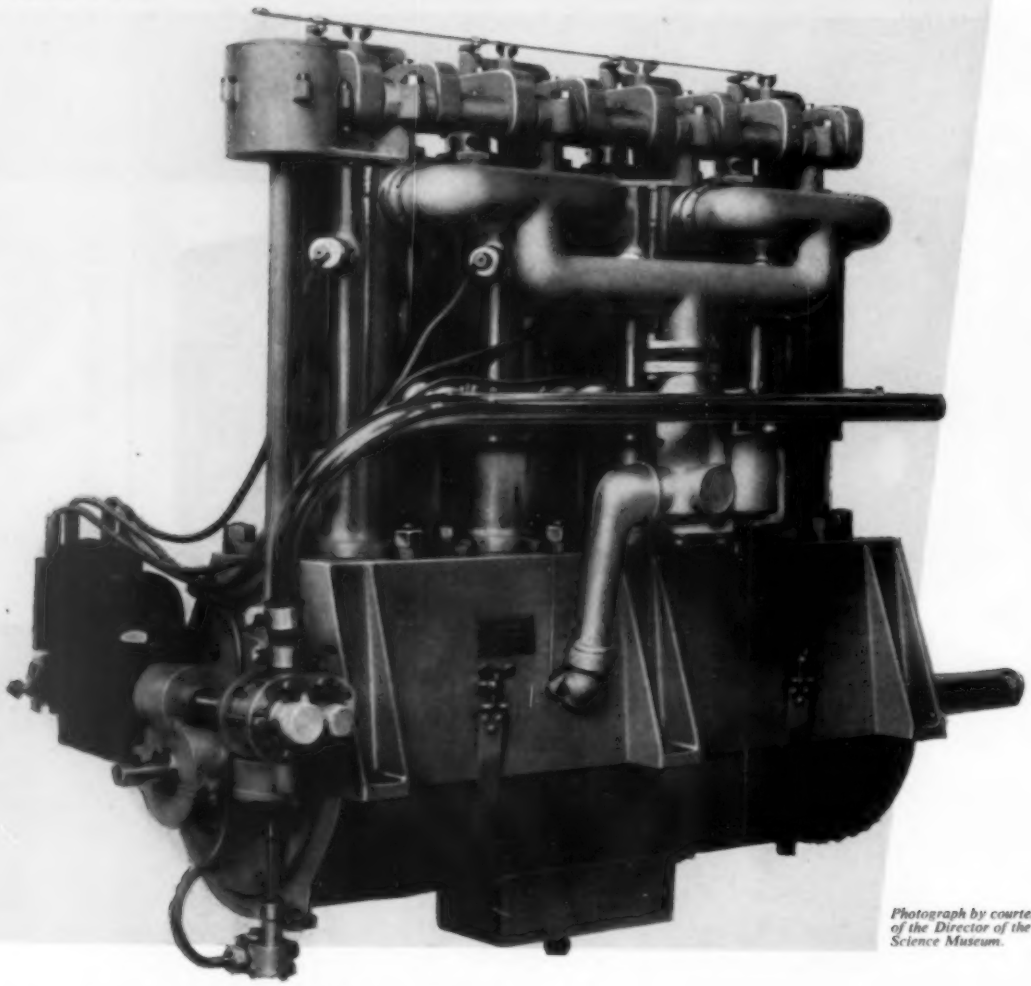
The Napier/Plessey High Frequency Ignition System employs an air gap igniter plug, ionized by a high voltage R.F. discharge. In cases where high intensity sparks at the rate of approx. 60 per second are required with either conventional or torch igniter plugs, this system is ideal. It can be employed to advantage in innumerable instances including small gas turbines for ground level use and oil fired furnaces and boilers. The unit illustrated is that employed in liquid fuel starting systems.

Special features

- Temperature range —40° to 70°C ground level use.
- Cables available to withstand 250° at ignition plug end. Non lethal.
- Uses conventional igniter plugs.
- High repetition rate of sparking.
- Small initial firing delay.
- Lightweight magnesium alloy case, humidity sealed. All components tropicalised.
- Conforms to D.E.F.S.T. Vibration conditions.

Plessey

A.66



Photograph by courtesy of the Director of the Science Museum.

ON OCTOBER 30th, 1909 . . .

. . . British aviation at last got into its stride. Moore-Brabazon, now Lord Brabazon, won the Daily Mail £1,000 prize for the first all-British flight. The course was a one mile circuit and the prize was captured on a Short-Wright biplane, one of the fine old "string-bag" line of aircraft.
A 35 h.p. four cylinder 1909 Green engine was used. The 60 h.p. version shown above achieved further success in 1911 by winning the Alexander Motor Prize with two consecutive runs of 12 hours. The bore and stroke of this engine were 140 mm. and 146 mm. with a weight of 250 lb. An overhead camshaft operated inlet and exhaust valves whilst auxiliary exhaust ports just below the copper water jacket assisted the clearance of old gases. Carburation for the early Green engines defies description. The mixture strength was uncontrollable and depended on the head of petrol in the tank. But later a Zenith carburetter was fitted which greatly improved the engine's performance. The main disadvantage of the Green engine seems to have been psychological. For some unaccountable reason—flexible water jackets perhaps, flimsy crankcase or maybe even loose engine bolts—pilots always noticed an alarming amount of cylinder wobble! But in spite of this it holds an important place in British aero-engine development, having at that time no equal for reliability. The Green engines will always be remembered for their part in the success of some of our earliest aeroplanes such as the Dunne V and the famous 1910 Blackburn Monoplane.
To-day, reliability is an inseparable part of the fuels and lubricants developed by Esso research groups, and designers and technicians now rely more and more on Esso for advice on suitable fuels and lubricants for future power-units.

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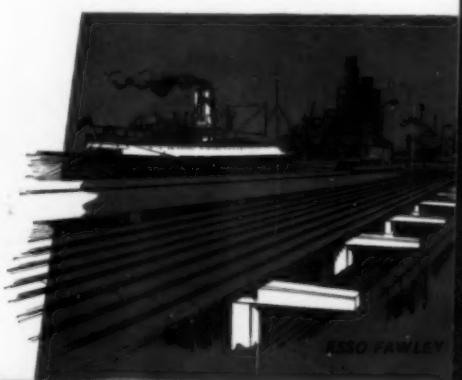
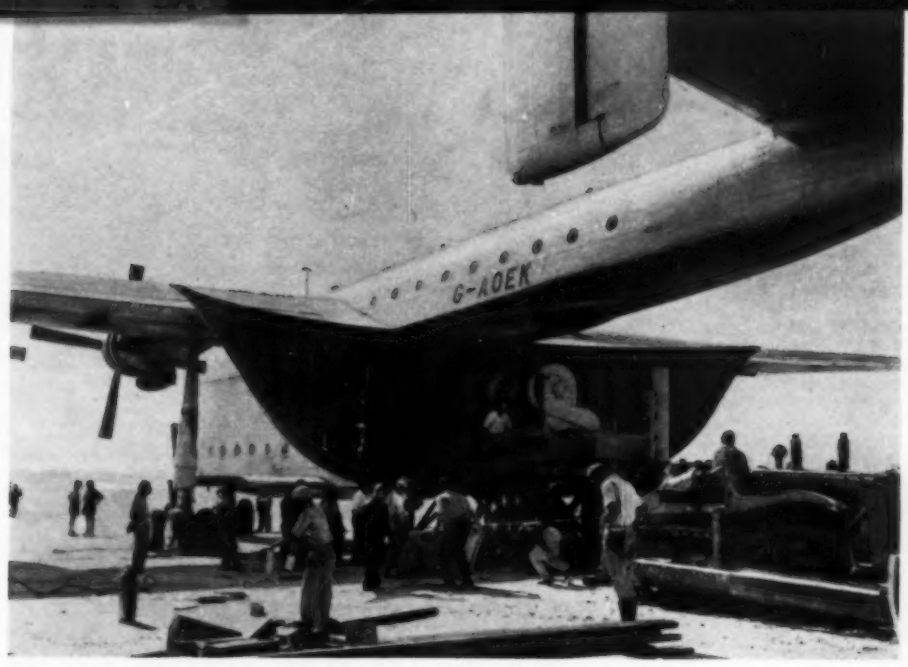




Typical of the out-of-the-way jobs done by aircraft, as described in this article, was the airlift of heavy oil machinery recently performed in the Arabian desert by a Blackburn Universal Freighter.

Off the Beaten Track

MULTIFARIOUS ACTIVITIES OF CIVIL AIRCRAFT THE WORLD OVER

ORVILLE WRIGHT had good reason for feeling sad when he recalled all the early promise of the aeroplane and commented: "What a dream it was; what a nightmare it has become!"

The frail wings with which he and his brother Wilbur had first become airborne 15 years earlier had given way to sturdier structures. But, instead of making war impossible by uncovering every movement of armies on the ground, the aeroplane itself had taken up arms and learned to kill. Orville could not have foreseen that it might become so efficient at the art that nations would no longer dare to wage total war.

Nor could he have known that aircraft would one day bring new life to tens of thousands of men, women and children who would otherwise have died; make fertile vast areas of barren earth; and wage a bitter, worthwhile war against the myriad insects which, since long before the time of man, have spread disease and disaster across the earth.

Even today we tend to divide aviation automatically into just two categories—air forces and airlines, carriers of ten-megaton bombs or an annual sixty million passengers. Yet there are an enormous number of aircraft that fall into neither of these categories, doing jobs that affect intimately the lives of all of us. They seldom hit the headlines, because much of the work is done in the world's "outbacks" by aircraft that are not so young as they were: or the people who are flying them are so busy they have no time to talk about their job; or they are taken for granted, which is the finest possible tribute to mechanical reliability and usefulness.

Right at this moment, perhaps, on the other side of the world, a quite ordinary farmer's wife may be flicking over a switch on a radio set and saying: "Eight V.T. The Homestead. I have a call. Can you hear me? Over." Miles from her nearest neighbours, on a 52,000-acre scrap of the Australian Inland, she badly needs a doctor for her little girl. Thirty years ago, the journey to fetch him would have cost many precious days.

Now, in the base of the Royal Flying Doctor Service at Broken Hill, N.S.W., another switch is depressed on another radio, and within a few minutes the doctor has listened to the child's symptoms, prescribed a medicine from among the numbered contents of a medical chest that goes with every Flying Doctor home radio

Australia, the most air-minded country in the world in proportion to its population: a D.H. Dragonfly and an Auster Autocar arrive at Aurukan with witnesses attending an important law case.

D

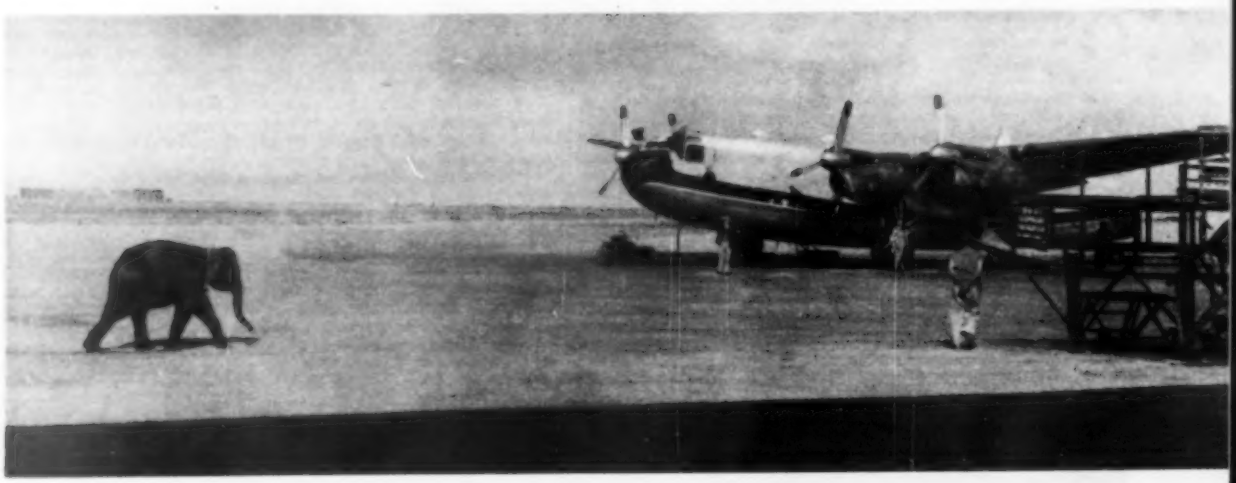
OFF THE BEATEN TRACK . . .

In no other rôle is the aircraft of more benefit to humanity than when it is used as a hospital ambulance in remote areas. (Below) A patient goes aboard a Dragon at Georgetown, Australia and (right) a B.E.A. Heron of the Scottish Air Ambulance Service lands at Barra.

and, if necessary, has begun the flight to a corner of his 280,000 square mile "practice". It's as easy as that—or nearly so.

Perhaps you have heard of "cockeye bobs", the great rolling thunderheads that come with monsoon weather in the tropical northern areas served by the Flying Doctor; or of "willie-willies", which can up-end an aeroplane in country where they say that if two mosquitoes sneeze you've got a vicious whirlwind column of dust lashing from earth to sky. These are just two of the meteorological problems that pilots have to contend with. Add the fact that they have few radio aids and no beacons to guide them in a search for a landmark that may consist of one tin roof at the centre of a vast featureless plain, a fine thread of boundary fence, a waterhole among the sandhills or, at night, the beams of motor car headlamps shining along the sunbaked claypan that serves as a landing strip.

Sometimes the pilots and doctors find themselves with mechanical as well as human repair jobs, when they touch down in a patch of swamp, or snag a tree-stump on a quickly-cleared strip. Often they have to refuel their aircraft themselves from heavy drums in broiling sun; and not all patients are of the kind to be found in a London doctor's surgery. There was, for example, the aborigine woman who had been involved in a fight. Before flying her to hospital, the pilot had to break off each end of the spear that protruded from her chest and back. Another pilot, after taking off from water-logged land in a crosswind, lost control repeatedly as he struggled to quieten the rough and delirious old man who shared the cabin with him.



A four-footed passenger about to embark on a B.O.A.C. York freighter. The carriage of livestock by air has developed into a specialized business, and many operators have special departments for this work.

These are exceptions, and, on the whole, the Flying Doctor and associated operations, like that operated by T.A.A. from Darwin, are streamlined, efficient services that fly a total of 350,000 miles a year in an area as big as Europe. As well as medical and ambulance missions, they make three and four-day routine flights to specific areas for child clinics, mass T.B. examinations, and field research into various health problems and dental treatment.

There are 11 Flying Doctor bases, of which only that at Broken Hill has its own aircraft and full-time pilots. The others depend on chartered machines and doctors employed by State and Federal governments.

The whole thing is a co-operative enterprise, with money coming from the governments and the farmers themselves, who contribute a fixed sum according to the size of their flocks and herds, plus certain fees. But help never depends on ability to pay and, as the radios are also used for telegrams and daily gossip in areas where women may not see a neighbour for weeks or even months, the Royal Flying Doctor Service has done much to banish both the fear and loneliness of life in the Inland.

Nevertheless, it remains a hard life and one of Australia's biggest problems is to develop her sparsely-populated territories. Some, like the Kimberleys of N.W. Australia, offer good grazing for cattle; but are without roads or railways, and the animals have to be driven over hundreds of miles of rough country to market. Typical were the 2,060 cattle which travelled overland 300 miles to the meat works at Wyndham on the coast in 1946-8. All were in prime condition when they set out, because it would have been a waste of time to expect lesser animals to survive the journey. Yet only 2.27 per cent were graded first quality on arrival and 26.54 per cent second quality. All walked off an average of 12.13 per cent of their weight.

In May, 1949, Australian National Airways and the MacRobertson-Miller Aviation Company began operating the well-known Air Beef scheme. They built an abattoir at Glenroy, to which all cattle in the district could be sent and then flown as carcases to Wyndham, 300 miles away. Instead of a road costing £10,000 a mile or railway costing £30,000 a mile, they built an "aerodrome" with 6,700ft and 5,400ft runways by clearing and flattening the hard earth at a cost of £80.

In the first three seasons, 5,577 cattle were handled, of which 24.36 per cent were graded first quality and 53.12 per cent second quality when the carcases reached Wyndham, although they included many animals that would have died on an overland drive.

The Australian Government has not yet given Air Beef the financial support it needs for rapid expansion; but steady progress has been made, and the 1955 season's total of 4,295 cattle handled at Glenroy was 239 more than in the previous year. It represented more than 2,000,000 lb of beef, which was flown out by a MacRobertson-Miller DC-3.

The second Air Beef centre, opened last year, is some 2,000 miles to the south-east of Glenroy. This is less surprising than it might seem because the Holyman family who founded A.N.A. have been shipping goods over the Bass Strait for more than 70 years, and the new centre is at Currie on King Island, off the north-west coast of Tasmania. Serving the properties of 200 ex-servicemen who have settled on the island, its abattoir can handle 100 cattle, 400 sheep and lambs, 100 pigs and 100 calves a week; and the meat is flown by A.N.A. DC-3 to Launceston, Tasmania, where it can be in the shops 2¼ hours after leaving the refrigerators at Currie.

If the new unit proves successful, a further abattoir will be opened on Flinders Island, which has been in the news fairly regularly in recent years because its inhabitants are particularly air-minded even for Australia, which is reckoned to be the "flyingest" country in the world. There was, for example, the retiring headmaster who moved furniture, bag, baggage and motor car from Flinders to Launceston by air, with a comparable return load guaranteed by his successor.

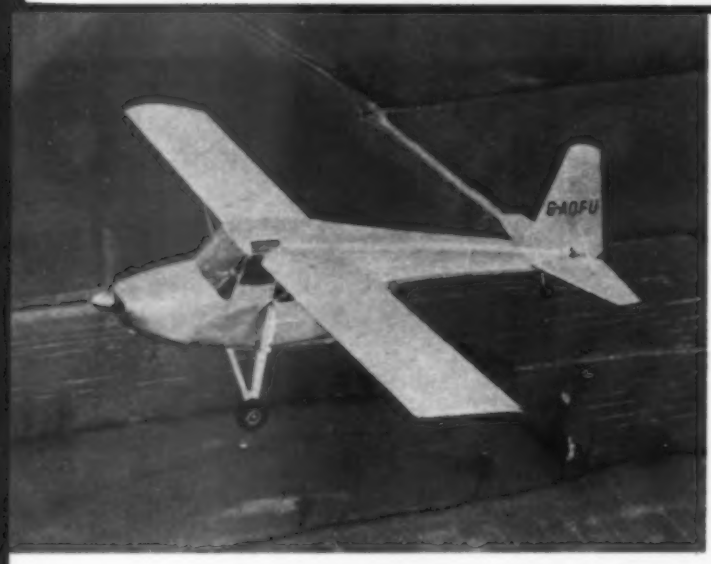
A.N.A. fly butter and crayfish regularly to the island, and when its airstrip was extended they carried over a 9,264 lb grader to help in the work. It was the heaviest single item ever air-freighted in Australia at the time. The longest was a 24-ft refrigerator for an ice cream company in Launceston. Hops, wool and fish are flown from Tasmania to the mainland; cherries and grapes in the opposite direction. Freighter loads of beans and prawns go from Queensland to Sydney and Melbourne, and prize sheep and cattle are as much everyday A.N.A. business as are passengers and mail.

Qantas, too, are involved in all kinds of odd jobs besides flying the fastest main line services between London and Sydney. Two of their Catalina flying boats are doing a fine charter operation for the Australasian Petroleum Company, who are exploring for oil in the jungles of Papua. Hundreds of native workers are flown periodically from site to site. Australian technicians are picked up for a break in the comparative paradise of Port Moresby. Twice a week "storpedoes" of frozen meat, fresh food, mail and even dynamite by the ton are parachuted into jungle clearings.

Nor is this the only place in S.E. Asia where aircraft fail to attract a second glance from people who were virtual stone age head-hunters a few years ago. Qantas operate thriving internal services with Beavers in New Guinea. Far to the north-west, Pioneers of No. 267 Squadron of the Royal Air Force service jungle forts in Malaya, where the permanent residents are aborigine home guards armed with shotguns or blowpipes and poisoned darts.

British officers and Malayan constables are flown into the forts, which are often surrounded by 300ft trees and 6,000ft mountains,

In many parts of the world the aircraft, fixed wing or rotary, is an indispensable farming implement. Here a Bell 47 dusts foliage in the U.S.A.



A new British aircraft designed as an all-purpose "aerial tractor" for the farmer is the Edgar Percival P.9, here seen flying over Essex.

OFF THE BEATEN TRACK . . .

and sick aborigines are sometimes flown out for hospital treatment. This gives them a new status among their less-fortunate fellow-tribesmen; but all benefit from the school equipment that is flown in for their children, and the pigs and poultry that are sometimes packed into the incoming Pioneers to improve the quality of their stock.

This airborne assistance for farmers is worldwide, and absorbs a high proportion of the total annual flying hours by all kinds of aircraft. Nowhere is this more true than in New Zealand, where more than 250 aircraft are kept working at full pressure on top dressing, which consists of dropping superphosphate and other chemicals to increase the area, and improve the quality, of grassland for sheep farming.

Since the work started in 1948, 750,000 tons of chemicals have been laid, mostly in country that is too rugged for ground operations, and experts believe it will lead to a 50 per cent increase in New Zealand meat and wool production within ten years.

Most of the work has been done with surplus military Tiger Moths, which were cheap to buy, easy to service and repair, and not too great a loss financially if they tried flying through a hill instead of over it. This happens occasionally, because the superphosphate has to be spread from as low as 50ft and the pilots show little respect for their overloaded Tigers.

Not a second is wasted, because so long as the chemical is dropping the operator is making money. In some particularly hilly places, no piece of land is more than 2½ miles from an airstrip and the total time taken from touchdown to take-off, including loading, can be as little as 25 seconds! Landings are made downwind and uphill to the loading area to save taxying time. Hoppers in the aircraft are loaded without stopping the engine, by means of a hopper mounted on hydraulic arms on the front of a lorry or tractor.

By using such techniques the pilot of a Fletcher FU-24 laid 230 tons of lime on a property in Central Hawke's Bay between 5 a.m. and dusk in a single day, during which he made over 300 landings and take-offs.

The FU-24 was designed especially for the job, and 100 are being assembled in New Zealand. They will be joined soon by the first of the new Auster Agricolas, which may prove even better. Certainly there is plenty of work to be done. In 1950, seven operators with 15 aircraft made 32,055 top-dressing flights, dropping 5,000 tons of chemicals over 48,741 acres. Comparable figures for 1955 were 49 operators, 230 aircraft, 1,079,269 flights, 279,006 tons and 2,783,802 acres.

Yet even this is only part of the story, for agricultural aircraft last year in New Zealand also sowed seed over 46,305 acres of land, dropped 2,719 tons of rabbit poison and sprayed 218,647 gallons of pest killer.

Nor is top-dressing the only aviation development pioneered in New Zealand since the war. Straits Air Freight Express of Wellington, a subsidiary of Airwork Ltd., have set new records for air freight turn-round time with their ingenious Cargon loading technique, which helped to win them in 1951 the coveted contract to operate the Rail/Air Service over the Cook Strait which links the railway systems of New Zealand's North and South Islands.

The basic idea is simple enough, being no more than an efficient method of transferring large-unit loads between three transport systems—rail, road and air—having more or less common load dimensions. New Zealand Railways, for whom the service is operated, built the four 40ft traverser loading decks, two of which are based at each of the terminal airfields of Paraparaumu and Woodbourne. These decks are mounted on a pair of four-wheeled bogies, so that they can be driven electrically along standard railway tracks; and they can be raised or lowered at either end to level up accurately with the tailboard of a lorry or the cargo hold of the Bristol Freighters flown by S.A.F.E.

A motorized endless chain runs down the centre of each deck, and the pre-loaded Cargons (removable cargo floors) are simply hooked on to this, so that they can be withdrawn from an aircraft, lorry or trailer, or loaded, in a single quick operation.

An even simpler and cheaper system was introduced at Nelson Airport towards the end of 1954 and is now in use also at Oamaru. In this the tail of the Freighter is jacked up until its floor is nearly horizontal, and the Cargons are pulled straight out on to waiting trailers, with a 3ft 6in hinged transfer bridge spanning any gap between the two floors. Outgoing loads are transferred directly from simple 32-ft long holding decks mounted on truck wheels.

The operating results are impressive, with an average aircraft turn-round time from touch-down to take-off of 20 minutes, compared with 75 minutes when hand-loaded. The work capacity of the three Freighters now used on the Service is therefore doubled, and the same is true of the motor vehicles. Loading can be completed by one man with one tractor and double trailer unit in 12-14 minutes, compared with six men, two tractor-trailer units in 90 minutes for hand loading.

The fact that loads are pushed in as a complete unit on the Cargon reduces handling of individual items, which can be sent with a minimum of protective packing at greatly reduced cost to the shippers. Cars, refrigerators, sheep, frozen foodstuffs, fruit and furniture are regular cargoes. So are racehorses, which are carried eight at a time in special lightweight boxes, complete with their trainers and sufficient fodder to last until they return to their

The Auster Agricola, latest machine intended specifically for topdressing work in New Zealand, made its first flight on December 8th last at Rearsby Aerodrome, Leicester.

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OFF THE BEATEN TRACK . . .

The aircraft as an arm of the law is typified by a Piper Tri-Pacer of the Kenya Police, whose Air Wing have accomplished a great deal in suppressing Mau-Mau terrorism.

home stables. They must, incidentally, be very satisfied customers, as the 70 horses carried in 1954 won over 30 "Firsts" and many placings.

Cargoes of eggs are carried twice a week from Oamaru, but the most surprising loads of all were the 50 4½-ton railway trucks transferred by Freighter from the South Island to North Island recently, at cheaper rates than those quoted by three independent shipping companies!

New Zealand was again in the aviation news last December, when two ski-equipped Neptunes took off from Christchurch on the 2,584-mile flight to McMurdo Sound in the Antarctic. Loaded with tents, food and survival gear, they formed the advance guard of the U.S. Navy's Air Development Squadron VX-6, which is supporting Rear-Admiral Richard Byrd's "Operation Deepfreeze" expedition.

The Squadron has 18 aircraft, of which six are helicopters. Its main duties will be to support the building of the major bases at Little America and Byrd Station, to airdrop some 500 tons of materials to the Seabees who will build a base at the South Pole, to map as much as possible of the unexplored areas of Antarctica and to carry out ice reconnaissance and rescue work.

Admiral Byrd will be on familiar ground, as he made the first flight over the South Pole in November 1929, in a Ford Tri-Motor piloted by Bernt Balchen. Now, during the Geophysical Year, the Polar skies look like becoming an air traffic controller's nightmare, with aircraft buzzing around in all directions; because both the New Zealand Expedition led by Sir Edmund Hillary and the British Expedition under Dr. Vivian Fuchs will have air support.

The exploits of the Auster which accompanied the British advance party on the *Theron* are already well known. On floats, and with patches over the holes in its wings caused by lumps of ice dynamited into the air to free the vessel from pack-ice, it made the 3½-hour reconnaissance which found a way out to the north-west. Later, on skis, it searched for a suitable shore base for the start of the trans-continental journey from Vahsel Bay, and discovered a hitherto unknown range of 6,000ft mountains some distance inland.

Many more discoveries will be made in the far south during the next 18 months, but nowhere is the job of mapping this icy continent being done more thoroughly than in the Grahamland Peninsula, which points an icy finger towards South America, 30 degrees to the west of Vahsel Bay. There 46 men, two helicopters, two Canso amphibians and a tiny freighter—the 900-ton *Oluf Sven*—completed in February the first 1,000 sq miles of Hunting Aerosurveys' contract to photograph the entire 60,000 sq mile British Dependency.

It is a job that could be done only by flying-boats and helicopters, because the only airfield or flying-boat base in the entire area which could be relied upon to be reasonably free from floating ice and to provide shelter from storms was the water-filled crater of an extinct volcano near the Meteorological Base on Deception Island. From here the Cansos make the long flights on which they are recording accurately hundreds of miles of unknown territory by both vertical and oblique photography. At the same time, an airborne magnetometer in the tail of one of them is being used to discover what minerals lie under the white continent.

As the Cansos fly to and fro on their precisely parallel pattern of photographic runs, the *Oluf Sven* moves slowly down the coast, carrying the two Autair S-51s which began by landing ground-surveyors on remote mountain ridges in the islands off the tip of the Peninsula. These men are left overnight to plot accurately by astro-fixes the key-points on the ground that will form known control points when maps are drawn from the air photographs.

The results of all this activity may prove the Antarctic to be rich in minerals and of great significance to future world economy. At the opposite end of the world's axis, the North polar regions have already become of vital importance, but for different reasons. The airlines see them as a short cut linking the old and new worlds *via* great circle routes of the kind pioneered by the SAS Copenhagen-Los Angeles service. But to Canada and America they also represent the shortest airways over which atom-bombers and intercontinental ballistic missiles might fly between Asia and North America.

For that reason, the two countries began several years ago looking to their defences against surprise attacks from the north. As a start, the Pinetree System of radar posts was brought into service just north of their common border, and this now links their basic radar warning and control systems and their inter-

One of countless special devices designed to speed up the handling of air freight is this 40ft traverser loading-deck, seen feeding a Bristol Freighter of Straits Air Freight Express, a New Zealand operating company.

The preservation and census of wild game and the enforcement of poaching laws is the responsibility of the U.S. Fish and Wildlife Service's air division. Here an F.W.S. Widgeon returns from a sortie, watched by two members of a goose-banding crew.

OFF THE BEATEN TRACK . . .

cepter forces. Next Canada undertook to build a complete radar chain along the 55th parallel. Known as the Mid-Canada Line, this $170 million project was a tremendous job; but its difficulties and achievements have been overshadowed by those of the fantastic DEWline (Distant Early Warning line) radar chain which the U.S.A.F. is forging along 3,000 miles of the Arctic Circle from Alaska to Greenland.

For generations, Canadian statesmen have dreamed of opening up the far north. Now it is being done with the help of the greatest air transport operation since the Berlin Air Lift. Although primarily an American responsibility, the R.C.A.F., R.C.N. and 15 Canadian private operators are working flat out to supplement the work of Arctic supply ships sailing in hazardous, uncharted waters.

Mosquitoes of Spartan Air Services began flying a photo survey of the whole length of the Canadian Arctic coast some three years ago. Early in 1955, in weather that was "60 below", a start was made on runways of ice and packed snow to receive the first supply aircraft, and soon the C-46s, DC-3s and Yorks began to fly in a never-ending stream from Hay River, Norman Wells, Edmonton and Yellowknife in the west, North Bay, Churchill, Montreal, Mont Joli and Knob Lake in the east, to points farther north than even the famed "bush" pilots had ventured.

With the help of two squadrons of Globemasters from the 63rd Troop Carrier Wing of the U.S. 18th Air Force, the initial task of flying in 22,500 tons of equipment and 1,500 men was completed by May 15th, at a cost of 12 aircraft lost or damaged. The seven C-46s contributed by Canadian Pacific Airlines alone lifted 5,815,991 lb of freight to DEWline sites in the first 20 weeks. Over 72 per cent of their total payload consisted of petrol and oil; but the remainder included food, snowploughs, electronic equipment, aircraft spares, pre-fabricated buildings, curtains, furniture and even the proverbial kitchen sinks. Flying 24 hours a day from Norman Wells in the Northwest Territory, they logged in that opening spell nearly 30,500 miles each week.

Second phase of Operation DEWline was to construct proper airstrips, and when this was finished work began on the radar sites themselves. Now it was the helicopter's turn to lend a hand, because when the R.C.N's icebreaker *Labrador* sailed north to shepherd thin-hulled merchant ships through heavy ice to DEWline unloading sites, her equipment included a Piasecki HUP-2 and two Bell HTL-4s.

Their primary duties during five months in Arctic waters were reconnaissance to find channels through the ice, and flying ashore surveyors and hydrographers engaged in mapping both the land and uncharted rocks off the coast. They also took repeated soundings ahead of the vessel with a hand-line, and discovered in one place a shoal only five fathoms below the surface where the charts showed 53 fathoms.

Other operations ranged from searching for, and finding, a missing U.S. soldier to flying ashore two complete navigation aid stations and the personnel to erect and operate them. After selecting the site for the first of these stations, the three helicopters completed in under 20 flying hours the job of ferrying ashore 28,640 lb of tents, shelters, generators, mast, equipment, fuel, food, a tide gauge and the lumber to build a crib for it. The second station could not have been set up at all by conventional methods, as tidal conditions and treacherous shoals made the coast unapproachable.

On another occasion, complete daymark beacons, weighing around 700 lb and standing 15ft high, were erected on the flight deck of the *Labrador,* picked up one at a time by the hovering HUP and transferred to exactly the right positions on the coast.

In a few places, white settlers and Eskimos were encountered, and then the ship's doctor was flown ashore to bring medical aid and advice to people who, sometimes, had never seen a doctor. So, here, as in the steaming jungles of Malaya, military necessity is bringing on its wings help and civilization to primitive peoples.

There are, however, some folks in the Alaska area for whom aviation has proved anything but a blessing, because it has disturbed the peace and quiet of their salmon fishing. The fact that they were doing it unlawfully and that the aircraft carried the insignia of the U.S. Fish and Wildfowl Service was their main concern, because they knew that their boat was being photographed and that the pictures would be taken down and used in evidence in court! Usually when this happens, the poachers enter a plea of guilty on the spot.

Law enforcement of this kind is only one of a vast number of jobs done by the Fish and Wildlife Service, which operates more than 35 aircraft in Alaska alone. Completely replacing the time-honoured teams of huskies, they are responsible for over half of the annual 240,000 miles of travelling by agents of the Service in the territory.

The luxury of many U.S. business aircraft is exemplified by this interior of an oil company's Convair 240; note the television set. The U.S.A. is the foremost patron of business flying: American executive aircraft fly more hours than all the domestic airlines combined.

The fleet is varied, but has a hard core of war-surplus Grumman Goose and Widgeon amphibians and assorted Pipers, plus a collection of other types that includes the last few airworthy Boeing YL-15 Scouts. They are flown a total of about 12,500 hours a year in Canada, Mexico, Cuba, Puerto Rico, Haiti and the Dominican Republic, as well as the United States and Alaska.

One of the biggest jobs is waterfowl census and for one particularly important count in California's San Joaquin Valley, the Service managed to acquire the assistance of two U.S.A.F. RF-80's, which raced low over a 22-mile strip of marsh-land photographing birds that would have been scared away by the oncoming noise of slower aircraft. In North Dakota sweet clover seed has been sown from the air to provide feed for waterfowl, and in many places spraying has kept down plants like water chestnuts which encroach on the birds' feeding grounds.

Ducks and geese are "herded" to keep them from destroying farmers' crops. Blocks of salt are dropped in some Western states to lure deer and elk off over-browsed areas. Migration studies are made easier by flying investigators to remote areas where birds are to be banded.

On the fishery side, survey parties are flown along streams to detect obstructions in the way of spawning salmon. Others land on lakes and bays to get water specimens for study. Aerial

photography is used to count salmon below the surface of the sea and for mapping streams and coastlines. Sometimes the surveys and photos also bring to light duck traps and illegal hunters, with such success that few poachers now see any future in their sport, especially since the aircraft began working in radio contact with ground patrols.

One final job that deserves mention is the transportation by air of wild animals to new and sometimes inaccessible areas. Deer have been transplanted from the United States to the Virgin Islands, and black grouse and capercaillie from Sweden to Wisconsin. Remote lakes have been re-stocked with baby fish, dropped into the water from low-flying aircraft without injury. But the most interesting story of all comes from Idaho, where very superior beavers have been dropped by parachute in cases which spring open as soon as they touch the ground.

Nor are beavers the only things that parachute on to remote areas in Idaho, and this seems as good a place as any to introduce the "smoke-jumpers" of the U.S. Forest Service—another of the air-minded American Government organizations. Their story is linked to a large extent with that of Johnson Flying Service of Missoula, Montana, a comparatively small U.S. operator which does a very big job without much publicity.

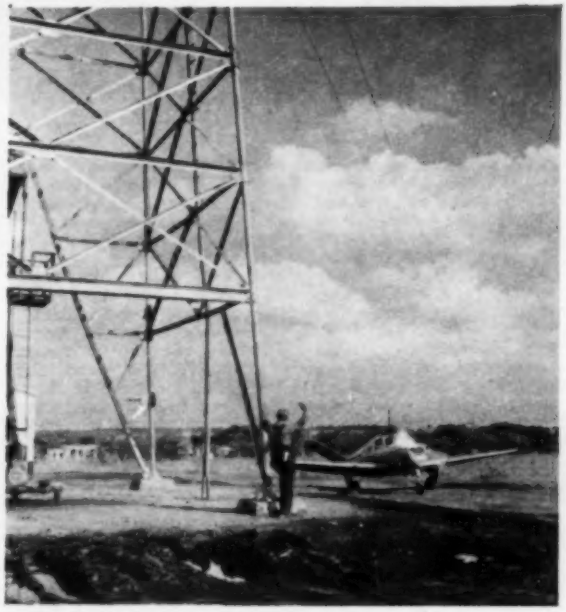
Its "boss", Bob Johnson, began flying fire-spotting missions over the Bitterroot mountains in 1928 and the story of how he built up his Service is one of the greatest in aviation's 50-year history. At that time, a really good storm could pepper the forest country with lightning fires that burned unchecked for weeks or months, and millions of acres of valuable timber were lost.

To supplement his fire-spotting, Johnson dropped into almost inaccessible regions all the materials needed to build look-out towers. Then he began landing fire-fighters in tiny clearings hacked out of the forest, and learned to parachute equipment and food to them. Each development reduced the time-lag that could turn a small blaze into a forest-devouring monster and by 1939 the only job Johnson could not do was deliver fire-fighters right to the doorstep of every fire.

Someone suggested parachuting men as well as supplies into the forests and a few trial drops were made over open ground. Then, one day, came the mistake that everyone had dreaded. Some of the parachutists mis-judged their jump and drifted into clusters of tall trees. Surprisingly, they reported the softest landings they had ever made, and from that moment there was nothing to stop the project. Wearing baseball masks, special helmets and padded clothing, the first two teams of eight volunteer smoke-jumpers began training for action, which came early in 1940 when the National Forests of the Northern Rockies began smoking in several isolated spots after a bad storm. Never had fires been tackled so quickly, or with such excellent results, and the number of smoke-jumpers has increased steadily ever since, although the total is still under 300.

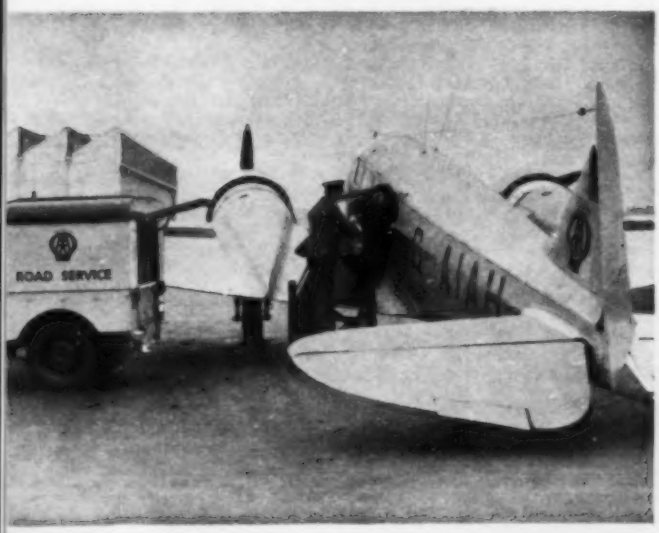
During the past three years, they have made 4,500 jumps from Bob Johnson's aircraft alone, at about one-third of the cost of ground parties, and have saved untold acres of timber. Despite the difficulty of judging their jumps in hot air currents that make the aircraft buck and sway, they normally land within 50 to 200 yards of their aiming point, using special 30-ft diameter 'chutes, with a wide scalloped edge to ensure a slow rate of descent and with two large flaps for steering. Personal equipment includes a knife and a rope with which the jumper can lower himself to the ground if he ends up in a high tree. Tools, lamps, rations, first aid kits, water canteens and other equipment are parachuted down after him, the whole operation taking no more than five or ten minutes.

In 1954, the smoke-jumpers dealt with 489 fires. In addition, 23,371 fire-fighters and other passengers were carried by aircraft owned or hired by the Forest Service, including quite a lot by helicopter, and more than a million pounds of supplies and equipment were parachuted to fire-fighters. In Operation Firestop, 40 men and a small fleet of aircraft spent 10 months studying new methods of coping with forest fires, during which they built 25 miles of experimental firebreaks, 10 miles of roads and tracks, three helicopter landing sites and 22 weather stations.



(Right) The president of an oil-drilling company arrives in his Bonanza at a site in Oklahoma. The U.S.A. has 21,500 private-use aircraft.

This Easter the Automobile Association used an Airspeed Consul—chartered from Morton Air Services—for an investigation of holiday road traffic problems. Radio communication was maintained with A.A. offices and patrols.



An old Avenger torpedo-bomber was rigged to drop 600 gallons of water or chemicals from its bomb-bay over an area 50ft wide and 270ft long. Hiller 12-B, Bell 47 and S-55 helicopters were also used for water bombing and to lay hose over rough country. The S-55 picked up and delivered to a fire area a small hook-on "helitanker," consisting of two 50-gallon tanks, a small pump and 300ft of hose. The results will make the aerial fire-fighters of the U.S. Forest Service even more efficient in the years ahead.

Nor are aircraft used only in the direct offensive against fires. Considerable successes have been achieved in re-seeding burned areas. Aerial survey and photography are widely used for inventories of timber resources. And aircraft play a big part in dealing with forest pests—both the human kind who start fires and the insects and diseases that can lay waste whole areas of fine timber.

Here again the Johnson Flying Service provides a good example, for its two DC-3s, one DC-2 and three Ford Trimotors have sprayed over a million acres of forest in the last three years to suppress spruce budworm and pine butterfly, at a cost of under a dollar per acre.

If we multiply this effort by about 1,000 we have a fair picture of the total resources being poured into agricultural flying in America, where nearly 7,000 aircraft, owned by 2,000 companies, do nothing else but help farmers and foresters. Of these, more than 5,000 are used for the application of dusts, sprays, seeds and fertilizers.

By comparison, it is estimated that some 65 aircraft are employed on similar work in Western Europe.

Yet agricultural aircraft are outnumbered three to one by the vast fleet of aircraft used for business flying in America. The total of 21,500 in 1954, the last year for which comparative statis-

OFF THE BEATEN TRACK . . .

The terror of forest fire is vividly illustrated by this U.S. Forest Service picture of a Californian National Forest ablaze. Without aviation the fire-fighter's task would be a hopeless one; acting as early warning scouts they help to avoid the rapid spread of conflagration, and are indispensible for the prompt delivery of men and equipment to the right spot at the right moment.

tics are available, was 17 times the size of the combined fleets of all U.S. domestic airlines. They spent an estimated 3,900,000 hours in the air and travelled some 546,000,000 miles, compared with the domestic airlines' total of 518,000,000 miles. And their safety record compared well with the best major airlines, although only about 2,500 were multi-engined.

The executive Viscounts ordered by United States Steel, Standard Oil and the Hughes Tool Company must rank among the most costly and elaborate flagships of the business fleet, which includes Convair-liners, DC-3s, many hundreds of Beechcraft D18s, about 80 D.H. Doves, converted wartime Mitchell and Marauder bombers, down through the luxury small "twins" and single-motor Bonanzas and Navions to the thousands of Cubs.

Large companies like Sinclair Oil, General Motors and Ohio Oil each have private fleets of about 20 aircraft; but the backbone of the boom in business flying is the small man-like Minneapolis publisher Ken Cook, who claims that his Bonanza helped him to triple his turnover in a year, by widening his market through personal contact with customers.

Newspapers like the *Cleveland Plaindealer* consider aircraft essential for on-the-spot coverage of sporting events, and a glance through the list of 300 commercial operators of Bell helicopters shows such varied uses as powerline patrol, scheduled air mail, spraying, photographic survey, traffic control, prospecting, movie-making, whale hunting and round-up and fence patrol work on two of the great Texas ranches.

This, in fact, is aviation serving the ordinary man in his ordinary everyday work, saving time and money—and tempers—when a spare part for a combine reaper can be fetched in an hour instead of half a day at harvest time.

"Serving the ordinary man in his ordinary, everyday job" is true also of the kind of aviation we find when we hop the Atlantic to Iceland. There the standard means of transport has always been the sturdy little Icelandic horse (the *faxi*), for motor cars are of little use in places like the south-eastern region of Oeraefi, which is surrounded by rivers and high mountains and has no roads connecting it with the rest of the country.

No wonder that when the airlines started in business they found hundreds of eager shareholders among the farmers who operate the country's second largest industry. Today, Iceland Airways carry everything from potatoes to tractors for the men of Oeraefi and fly their produce to market in Reykjavik. When foot-and-mouth disease struck down the herds of sheep belonging to their friends 200 miles to the west, these same farmers chartered a DC-3 and "exported" more than 600 of their own sheep to re-stock the empty holdings.

A different kind of trouble hit Iceland's other great industry a few months ago, when huge schools of 30-ft long, four-ton killer whales invaded the fishing banks, ripping nets to shreds and feeding on the small fish that are both the food and the livelihood of the fishermen.

This time the U.S. Navy came to the rescue. Within a few hours, a Neptune of Navy Patrol Squadron 18 took off from its base at Keflavik to try and find the killers. This was easy, for the sea was black with them 25 miles to the west of the island.

Dropping to a height of 150ft, the Neptune straddled the whales with a stick of eight 325 lb depth-charges and then returned to machine-gun the whole area for 20 minutes. As it turned for home, other Neptunes arrived to take up the chase, and soon only a few scattered whales remained in the fishing banks.

And so on to Britain and Western Europe, where a highly-developed system of road and rail communications has made unnecessary many of the jobs that aviation is doing elsewhere in the world. Yet even here we have our "outbacks" and odd jobs.

There is, for example, B.E.A.'s Air Ambulance Unit up at Renfrew in Scotland, flying its errands of mercy in all weathers, even when other aircraft are grounded. About 85 per cent of its calls are from the Western Isles and the Kintyre Peninsula, and for nine years up to March 1955 the Corporation's veteran Rapides were a familiar and welcome sight on the airstrips at Coll, Colinsay, Sollas and Northton Beach (Harris), and on the hard flat beach that forms the landing strip on Barra. Now they have given way to three new Herons, and Pioneers have also been used occasionally.

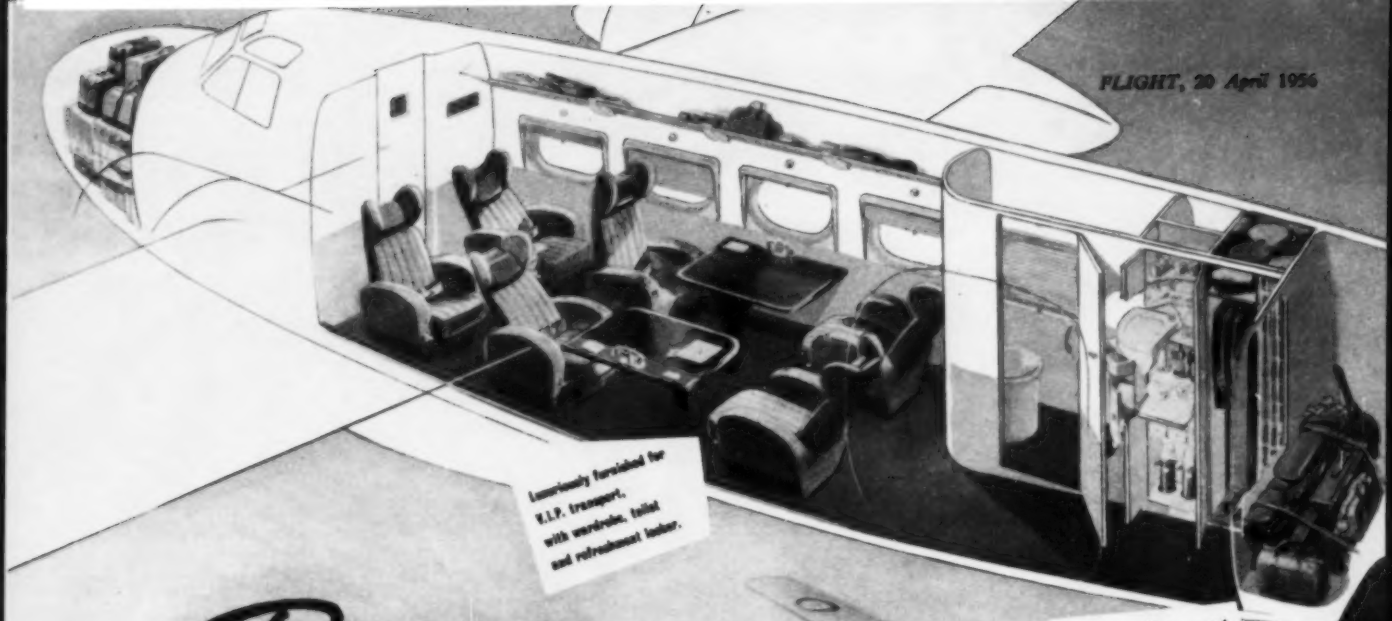
During 1955, the Unit flew more than 200 ambulance missions, covering over 51,000 miles in 450 flying hours and, inevitably, operations on such a scale produce some unusual stories. The baby that was born in the air en route to Renfrew was not altogether unexpected; but the enormous hole that appeared one day in the middle of the "landing field" at Barra was!

It appeared that one of the locals was carting away large chunks of beach and, when tackled about it, he pointed out that he was quite entitled to do so. In fact his family had been doing it for generations, because Barra sand is the perfect lining for the bottom of birdcages. Perhaps it is as well that the pilot's reply went unrecorded.

B.E.A. operate other ambulance services in the south and during 1955 nine flights were made between Penzance and the Scillies and about half-a-dozen to Jersey and Guernsey, to bring hospital cases to England.

Add on to this work the very extensive charter operations such as those which bring daffodils by the thousand from the Scillies

Mineral hunter; air survey today is big business, and no company is more experienced in this work than the Hunting Group. This is a picture taken very recently of the U.K. companies' DC-3 specially equipped for geophysical survey ("Flight," February 17th, 1956).



Pembroke

(Powered by Alvis 'Leonides' engines)

In large scale service with the ROYAL AIR FORCE and also adopted by the Air Forces of BELGIUM, RHODESIA, SWEDEN, FINLAND and DENMARK, the PEMBROKE has proved itself to be among the most rugged, dependable, and versatile aircraft in service anywhere in the world.

★ ***The Pembroke is particularly suitable for use as a personal transport for Senior Officers, in which role it is equipped for the accommodation of six passengers in considerable comfort.***

★ ***The standard communications aircraft has seats for 10 passengers, which can be arranged to be either forward or rearward facing.***

★ ***These seats are quickly removable for conversion to the freighting, aerial survey and photography, 6 stretcher air ambulance or supplies dropping roles.***

★ ***The Pembroke can also be equipped as a flying class room for radio, bombing and radar training and for twin engined pilot training.***

★ ***Provision is made for all these roles in the basic structure.***

10 Passengers in forward or rearward facing seats, and ample baggage space.
For parachuting supplies, the Pembroke is flown with the doors removed.
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This is the low pressure stator blading of the Bristol BE25 supercharged turboprop engine, part of an "inside story" which has made the BE25 a power unit of unique importance to the commercial aircraft of the future. Around this engine, which is able to maintain a constant power of 4,000 h.p. from sea-level to heights around 20,000 feet, will be built the 130-passenger, 500 m.p.h. Bristol Type 187 very long range airliner of the 1960's.

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BRISTOL

BRISTOL AERO-ENGINES LIMITED FILTON HOUSE BRISTOL

Canada, perhaps more than any country, is the land of "off-the-beaten-track" aviation. It has bred some fine aircraft for this work, including the D.H. Otter, one of which is seen here on forest fire-fighting duty.

A D.H. Beaver, one of the most versatile of odd-jobbing aircraft, seen dropping fencing equipment in New Zealand. Under the port wing is a two-hundredweight coil of fencing wire.

OFF THE BEATEN TRACK . . .

and cheese by the ton from France and it is obvious that even Britain finds some use for aviation outside of scheduled airline operations.

The most enterprising idea of all was, of course, the air ferry service pioneered by Silver City in 1948; but this has now grown to the stage where it is itself a smooth, streamlined, scheduled operation, complete with its own privately owned terminal; and the 57,101 vehicles that Silver City carried across the Channel and Irish Sea in 1955 formed a high proportion of the 72,333 tons of freight that earned them the title of the world's largest air cargo operators.

Nearly 600 tons of the total were, however, contributed by a remarkable airlift operation in the Middle East, in which Silver City played an important part.

It all started when the Iraq Petroleum Company decided to prospect for oil at Jebel Fahud (the hill of the lions) in the heart of an Arabian desert. For various reasons, the only possible surface route from the Company's base at Umm Said on the Persian Gulf involved a 900-mile sea trip to a place called Duqm, which was entirely lacking in harbour facilities, followed by an arduous 350-mile desert crossing, the whole journey taking at least two weeks.

A Bell 47 doing one of those jobs at which the helicopter is pre-eminent —cross-country cable-laying.

So the decision was taken to fly in as much material as possible by air and two Silver City Superfreighters began ferrying pre-fabricated buildings, mining equipment and supplies over the 365-mile route from Umm Said to Jebel Fahud on September 27th, 1955.

Soon the strip of cleared desert that served Fahud for an airfield began to take on the appearance of a major international airport because, in addition to the Superfreighters, there were Dakotas belonging to Hunting-Clan, Air Liban Yorks flying in food and fresh vegetables and the Petroleum Company's own executive Dove. The climax was reached in November, when a production Blackburn Beverley, wearing a civil registration and hence the name of Universal Freighter, arrived to tackle the loads that were too big for the other aircraft.

Flying nine return trips in ten days, this great aircraft airlifted no less than 129 tons of equipment, starting with an 8½-ton Paxman diesel engine and working up to a 16½-ton section of the drilling rig, which measured 22 by 8½ by 7½ft in size. Furthermore, it proved its ability to cope with such massive chunks of ironmongery using loading ramps welded up on site from odd lengths of drill-pipe.

Never has there been a better example of the way in which air transport can handle a major engineering project, for there was not a single item of equipment or section of building at Fahud that could not have been flown in by the Universal. This is of primary importance for operations like oil prospecting, in areas where surface routes do not exist or involve hard, dangerous overland journeys, because the alternative of building roads or even tracks would be a complete waste of money if no oil were found.

There is little doubt that the oil companies appreciate this, for they are the most consistent users of aviation in the world's outbacks, wherever oil can be found. And, of course, much of the insecticide sprayed from agricultural aircraft is produced by them.

This brings us to the last stage of our round-the-world survey of unscheduled aviation, and it is a very frightening one. The setting is in Rhodesia, where Ansons and Rapides belonging to Noon and Pearce Air Charters have been waging an almost hopeless war with insecticide against untold millions of locusts.

If you cannot believe that this is frightening, make a point of seeing the Shell Film Unit's *The Rival World*, an international prize-winning film that includes aerial scenes of a Rapide flying through one of the locust swarms for minute after minute, laying its trail of spray, and becoming more and more covered with a gooey mess of locusts that spatter like machine-gun fire against its nose, struts and the fabric of its wings and fuselage.

The struggle seems almost futile; yet it is essential if whole areas are not to be made barren and lifeless by the locusts that form only one of the million known species of the rival insect world that destroys a third of everything we grow.

Also in this film are the insects that destroy life—the anopheline mosquito, spreader of the malaria that is the scourge of one-sixth of the whole human race and kills somebody, somewhere in the world every ten seconds of every day and night: the tsetse fly, bearer of sleeping sickness; the simulian fly that brings blindness; the culicine mosquito that causes elephantiasis; a horrifying succession of man's tiniest and deadliest enemies that are suffering an occasional repulse as a result of air spraying; but no more.

Here, then, is a true nightmare—a war to be waged that is far more worthy of human endeavour than are our present inter-tribal squabbles. With the world population increasing continually at a rate that is outstripping food production, the war against the rival world may yet prove to be the greatest of all tasks and triumphs for aviation in the years ahead.

J. W. R. T.

The British

B.O.A.C.

A Bristol Britannia, B.O.A.C.'s first-line equipment for the competitive years ahead. (Below) Sir Miles Thomas, D.F.C., whose name will always be linked with that of the British Overseas Airways Corporation.

THREE weeks ago it was announced that British Overseas Airways Corporation had made a net profit of some £500,000 during the financial year ended March 31st, 1956. This profit was double that for the previous year (though still some way off the £1m peak of 1953-54) making it apparent that the Corporation, despite its lack of new equipment, is steadily regaining the ground which it lost to its competitors after the Comet setback two years ago. Ton-miles flown in the year showed a healthy 10 per cent gain over 1954, in which year, through lack of capacity, there had been a decline in traffic. Actual operating costs and revenue for the year are not available in full, but the total gross surplus (i.e., before deduction of interests on capital), was about £1¼m up to March 31st, 1956. Announcing this heartening result the Corporation's chairman, Sir Miles Thomas, said that it had been achieved in the face of "massive difficulties." B.O.A.C. had, he said, successfully challenged the aggressive enterprise of the biggest world operators, most of whom had dollars available to buy the latest types of American aircraft. There was, he added, a whole wealth of tradition and training in B.O.A.C. which would take foreign airlines a long time to match.

Sir Miles recently announced his decision to relinquish his chairmanship of B.O.A.C., news which has given rise to the expression of many doubts about the future leadership of the Corporation during the next few critical years. One of the problems his successor will have to solve, in view of the fact that most of B.O.A.C.'s transatlantic competitors now have Douglas DC-8s or Boeing 707s on order for 1959-1960, is the future equipment policy of the Corporation. Yet the immediate re-equipment prospects are far from bleak: in a few weeks' time the Bristol Britannia will be making its competitive presence strongly felt, first on the Corporation's routes to South Africa, and later in the year to the Far East and Australia. Four of fifteen Mk. 102s have already been delivered after completion of a pre-service test programme of great severity, and a vigorous B.O.A.C. training programme has been in hand since the beginning of the year. Next year the long-range, higher capacity Mk. 312s will put the Corporation well ahead of its transatlantic competitors, until which time the DC-7Cs which are on order will enable B.O.A.C. to compete on equal terms on this important route.

B.O.A.C.'s present operating fleet comprises 21 Argonauts, 16 Constellation 749s, 16 Stratocruisers, and four York Freighters. Four of 15 Britannia 102s have been delivered; 11 long-range Britannia 312s will be introduced during 1957, together with five long-range 305s and two medium-range 302s. The first of ten DC-7Cs will be delivered towards the end of this year, with the fleet of ten at full strength by mid-1957.

A particularly bright prospect is the resumption in 1958 of Comet services. B.O.A.C. have a twenty-strong fleet of Comet 4s on order, and the reward to B.O.A.C.'s firm belief in this aircraft will be its appearance on the air routes ahead of its larger jet competitors, to which it will concede nothing in economy or appeal, and over which it will have an advantage in the modesty of its airport requirements. Well in advance of the Comet 4, probably later this year or early next, a Comet 2 with Comet 4 engines (Rolls-Royce Avon Ra.29s) will be delivered for route - proving and crew-training.

B.O.A.C.'s present world routes, including those of its subsidiaries (detailed in the World Airline Directory in this issue) extend to Canada, the U.S.A., the Caribbean, South and Central America (the direct England-to-South America service was discontinued in 1954), Europe, the Middle East, Africa, India, the Far East, and Australia.

Talks between the United States and British Governments on behalf of B.O.A.C. and American airline interests were held during the year to discuss the Corporation's plans for extending its services, bringing nearer the realization of the Corporation's plans for round-the-world operation. A hint of future intentions was given by Sir Miles Thomas last September, when he forecast a west-about route from London across the Pole *via* Canada and the Aleutians to Tokyo, and to the U.S.A. West Coast; the Corporation's new landing rights at San Francisco could also provide the link between London and the Qantas trans-Pacific service to Australia, which is already served by the existing B.O.A.C. eastern route. There is still no immediate prospect of operations to South America, although it is the Corporation's firm intention to resume services when the Britannia fleet is at full strength.

The expansion of services in immediate prospect for the coming summer include 27 return flights across the Atlantic, 18 to the U.S.A., seven to Canada and two to the Caribbean; the Stratocruiser Monarch service will fly overnight every night between London and New York, and for the first time Detroit will be served by London to Chicago tourist flights. An imminent important change in the Springbok service will be the introduction of DC-7Bs by B.O.A.C.'s partner, South African Airways, and it will be interesting to watch how traffic is shared between these aircraft and, as from July, B.O.A.C.'s Britannias.

Viscounts were put into service during the year by B.O.A.C.'s associate, B.W.I.A., and this summer they will be flying on the routes between the Caribbean and New York.

1955 Traffic: Revenue scheduled passengers carried, 341,083; freight (short tons), 7,337; mail (short tons), 3,675; revenue load ton-miles flown, 148,682,367; number of staff at December 31st, 18,411.

Senior Executives of B.O.A.C. include: Sir Miles Thomas, chairman and chief executive (due to retire before June 30th); Lord Rennell of Rodd, deputy chairman; Basil Smallpeice, deputy chief executive; Major J. R. McCrindle, adviser on international affairs; Sir Victor Tait, operations director; H. O. Houchen, deputy operations director; A. C. Campbell Orde, operations development director; Sir William Cushion, supplies manager; C. Abell, chief engineer; J. R. Stainton, general manager, stations and traffic; Keith Granville, sales director; Gilbert Lee, general sales manager; B. G. Porter, administration director; K. W. Bevan, chief accountant; H. C. Spear, chief personnel officer; F. C. Gillman, chief Press and information officer; K. H. Staple, secretary and legal adviser; Sir Harold Whittingham, director medical services.

Headquarters: London Airport, Hounslow, Middlesex.

Sydney, Australia, sees the Comet 3 prototype in its B.O.A.C. colours —a glimpse of the future. A fleet of 20 Comet 4s is on order for delivery between the years 1958 and 1960.

Corporations

B.E.A.

A B.E.A. Viscount comes in to land past the Corporation's maintenance base at London Airport. B.E.A.'s investment in the future of the turboprop will in 1960 amount to more than 80 Vickers Viscounts and Vanguards.

"WE are," said British European Airways' chairman recently, "hoping to achieve great things this year." During the six-month period beginning the day after tomorrow, April 22nd, when the Corporation introduces its full summer schedules, B.E.A. are aiming to carry 1¾ million passengers and to earn £15.3m in traffic revenue. These figures represent an ambitious increase on the summer 1955 results of some 20 per cent, but there seems little doubt that the target will be achieved. The Corporation has not before been in a sounder position: its fleet is the finest on European routes, and last year, for the first time in its history, B.E.A. ran at a profit. In that year a net surplus of £862,000 was produced, compared with a deficit of £400,000 in 1954.

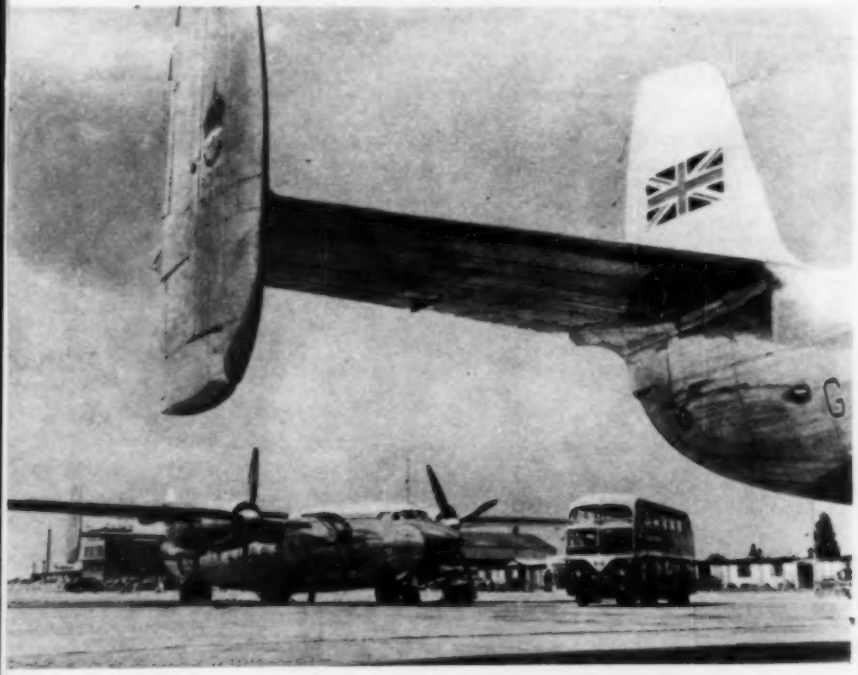
During the year B.E.A. lost the leadership of its chief executive, Mr. Peter Masefield, who left in November to become managing director of Bristol Aircraft. The strength of the Corporation's present position undoubtedly owes much to his forward planning during the past seven years, in which time B.E.A. has risen to become, in terms of passengers flown, second only to PanAm and T.W.A. as an international carrier. Lord Douglas assumed the responsibilities of chief executive after Mr. Masefield's retirement, strengthening the Corporation's top administration by the appointment of Mr. A. H. Milward as his deputy.

B.E.A.'s domestic and international 22,000-mile route network showed no marked expansion during the year, emphasis being on the improvement of service on existing routes. The S-55 helicopter service between the South Bank and London Airport, started in July, was recently discontinued, but the Corporation's plans to develop helicopter travel are under close review: a Bristol 173 will be put into experimental operation during the summer, B.E.A. being convinced that twin engines are essential to successful scheduled helicopter passenger services.

The best piece of B.E.A. re-equipment news during the year was the announcement in October that an order had been placed for 20 Vickers Vanguards. This large-capacity aircraft, whose design is based on the sound foundations of Viscount experience, promises to be a most challenging airliner. Its introduction into service will not be until 1960, but in the meantime B.E.A. will have steadily expanded its turboprop fleet—there are now 29 Viscounts in service—to a strength of nearly 70 aircraft, B.E.A. having during the year placed orders for no fewer than 38 Viscount Majors. The composition of the Viscount Major fleet will be 22 802s to be followed by 16 806s. By 1960, therefore, B.E.A. will have a mainline turboprop fleet of more than 80 Viscounts and Vanguards.

Lord Douglas of Kirtleside, G.C.B., M.C., D.F.C., B.E.A.'s chairman.

(Below) The D.H.-Airspeed Elizabethan, which continues to form a strong element in B.E.A.'s domestic and international fleet.



The Corporation's plans to re-engine its 19 Elizabethans with turboprops are not now likely to materialize: these aircraft have a long life ahead of them as high-density short-haulers and should continue to be good money-makers in their present form. It is unlikely also that B.E.A. will now go ahead with its plans for a DC-3 replacement.

Present equipment in service is as follows: 29 Viscount 701s, 19 Elizabethans, 38 DC-3 Pionairs, eight Pionair-Leopards, six Dragon Rapides, two Heron 1s, three S-55s, two Bristol 171s, and one Bell 47.

1955 Traffic: Revenue passengers carried, 2,156,791; freight (short tons), 17,176; mail (short tons), 7,805; revenue load ton-miles flown, 75,950,433; number of staff at December 31st, 9,549.

Senior Executives of B.E.A. include: Lord Douglas of Kirtleside, chairman and chief executive; Sir John Keeling, deputy chairman; Mr. A. H. Milward, deputy chief executive; P. C. F. Lawton, commercial director; B. S. Shenstone, chief engineer; R. L. Weir, financial controller; J. W. G. James, flight operations director; E. P. Wingfield, traffic director; H. E. Marking, secretary; Dr. Buchanon Barbour, director of medical services; R. Watson, chief personnel officer; W. Simpson, chief public relations officer.

Headquarters: Keyline House, South Ruislip, Middlesex.

An Airwork Viking on the company's Colonial Coach run to East Africa.

Operations, Managements and Fleets of Companies offering Scheduled and Charter Services

BRITISH INDEPENDENT OPERATORS

Air Charter, Ltd.—Channel Air Bridge service for vehicles and supplementary freight, Southend to Calais and Ostend, also to Rotterdam when the airport there is opened in the late summer 1956. Trooping in West Africa and charter (passengers and freight). Head office, 15 Great Cumberland Place, London, W.1. Main bases, Southend and Stansted, Essex. Managing Director: F. A. Laker. Executives: Capt. E. N. Jennings (chief pilot and operations manager), G. W. Forster (commercial manager), A. F. Nickalls (chief accountant). Fleet: two Yorks, six Tudors, three Bristol 170s Mk 31, two Bristol 170s Mk 32, two DC-4s. On order: four Bristol 170s Mk 32, one DC-4. In the 12 months ending September 30th, 1955, Air Charter carried 123,938 passengers, 33,264 short tons of freight, and flew 3,365,929 revenue miles.

Air Couriers (Transport), Ltd.—Operators of general charter and press and television flying. Head office, Croydon Airport, Surrey. Main base, Croydon. Executives: C. P. L. Godsal, F. W. Griffith (directors) and K. J. Kelly (chief engineer). Fleet: two Rapides and two Gemini.

Air Kruise, Ltd. (Trans-Channel Airways).—Scheduled passenger, inclusive tour and charter services. Head office, Lydd Airport, Lydd, Kent. Main base, Lydd Airport. Scheduled routes: Lydd to Le Touquet, Ostend and Calais. Inclusive tour routes, Lydd to Basle, Palma, Turin, Venice, Luxembourg, Barcelona, Lyon, Jersey, Munich, and Manchester to Geneva, Ostend and Luxembourg. Fleet: six Dakotas, three Bristol 170s. On order: six Heralds. In 1955 Air Kruise carried 36,500 passengers.

Air Navigation and Trading Co., Ltd.—Contract charter services and flying training. Head office, Squires Gate Airport, Blackpool. Main bases, Blackpool and Middleton. Executives: R. L. Whyham (chairman and chief engineer), G. C. S. Whyham (operations manager), Capt. T. J. Franks (chief pilot), E. Minshaw (C.F.I.), and W. R. MacPherson (chief inspector). Fleet: two Avro 19s, four Ansons, two Rapides, two Dragons, six Austers, four Tiger Moths and three Proctors. On order: one Drover or Otter. In 1955 Air Navigation and Trading carried 18,200 passengers.

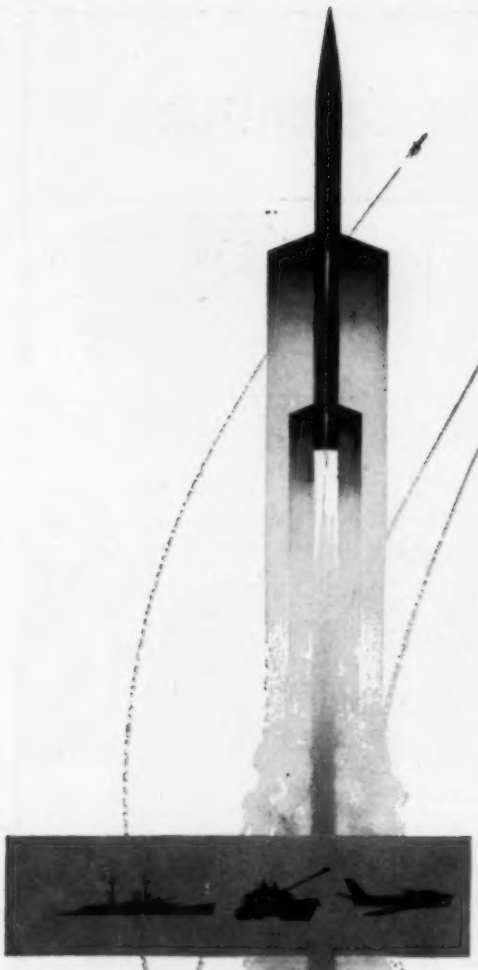
Airviews, Ltd.—Scheduled passenger services, charter and pleasure flights and aerial photography. Head office, Manchester Airport, Wythenshawe, Manchester. Main base, Manchester Airport. Executives: J. B. Martin and B. M. Martin. Scheduled routes: Manchester-Southampton-Isle of Wight and Manchester-Newquay. Fleet: two Rapides and one Auster.

Airways Union, Ltd.—The company controls subsidiaries engaged in the manufacture and repair of aircraft and components and the operation of airports, flying clubs, charter services and flying schools. Head office, The Airport, Weston-super-Mare, Somerset. Main bases, Weston-super-Mare, Exeter and Plymouth. Executives: R. King-Farlow (chairman), S. J. Cox (secretary and general manager), F. G. Jeans, W. R. Parkhouse and R. J. B. Pearse. Fleet: One Gemini, three Austers, four Tiger Moths and one Miles Messenger. In 1955 Airways Union carried 4,218 passengers.

Airwork, Ltd.—Operators of scheduled overseas passenger services, long-term contract flying and trooping services. Head office, 35, Piccadilly, London, W.1. Main bases, London Airport and Blackbushe. Senior executives: M. D. N. Wyatt (chairman and managing director), Sir Archibald Hope (director), R. Loudon Cumming (director and secretary), A. G. Miller (general manager, commercial), L. A. Lafone (general manager, technical), L. R. Castlemaine (general sales manager). Scheduled routes: Colonial coach services from London to Nairobi, Salisbury and Accra with intermediate traffic rights on each route. Fleet: four Hermes, eight Vikings and four Dakotas. In 1955 Airwork carried 35,762 passengers, 1,332 short tons of freight and three short tons of mail, and flew 11,597,558 revenue short ton-miles on their scheduled services and 16,778,063 capacity ton-miles on their non-scheduled services.

Aquila Airways, Ltd.—Scheduled flying-boat passenger services, and charter and trooping work. Head office, 1 Great Cumberland Place, London, W.1. Main base, Southampton. Executives: B. T. Aikman (managing director) and R. J. Clark (commercial manager). Scheduled routes: Southampton-Lisbon-Madeira-Canary Islands, Southampton-Lisbon-Canary Islands, Southampton-Marseilles-Capri/Ischia, Southampton-Genoa and Santa Margherita and Southampton-Marseilles-Genoa. A ser-

A Heron 2 of Cambrian Airways, one of three used on West Country services.



FASTER
FARTHER
HIGHER

The development of guided missiles of every type is becoming one of the most competitive areas in our world today . . . for supremacy in this field can well determine peace for many years. The race is now for greater speed, higher altitude, longer range, more sensitive control.

The strength of Western defence lies to a great extent in the development for the Armed Forces of these new weapons systems suited to the supersonic age. The once deadly cannon, machine gun and rocket are being superseded by complex weapons of great ingenuity.

Canadair has long had a prominent role in Canada's guided missile program, applying the knowledge acquired in years of experience in advanced aircraft systems engineering . . . and Canadair's research, engineering and manufacturing resources are constantly making further important contributions to projects in this field.

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E

Pilot-operated radio telephony

Marconi self-tuning
multi-channel
HF communication equipment
Type AD307

The type AD 307 has been designed to meet the requirements of international airline operators. Full frequency coverage is coupled with extreme simplicity of operation. Its features include :—

- **Automatic frequency changing with self-tuning circuits throughout.**
- **Up to 200 crystal controlled channels.**
- **Valves replaceable by standard American types.**
- **Remote-control from two alternative positions.**
- **Self-tuning feature eliminates the need for skilled adjustment.**
- **100-120 watts on telephony.**
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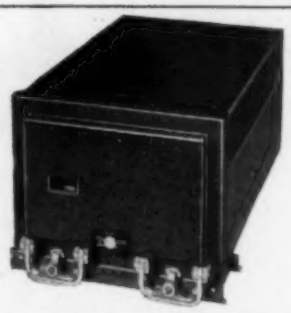
- **Designed for use with DC or AC aircraft systems.**
- **Plug-in unit construction is employed for easy servicing.**

More than forty Airlines and twenty Air Forces fit Marconi air radio equipment. Marconi airport installations are in use throughout the world.

★ Not shown is the automatic Aerial Tuning Unit.



DRIVE AND RECEIVER UNIT

POWER AMPLIFIER UNIT

MODULATOR AND POWER UNIT

Lifeline of Communication

MARCONI

Airport and Aircraft Radio Systems

MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED, CHELMSFORD, ESSEX

LA14

BRITISH INDEPENDENT OPERATORS . . .

vice between Southampton and Ibiza (Balearic Islands) has been applied for. Fleet: five Short Solents. In 1955 Aquila Airways carried 11,483 passengers.

Autair, Ltd. (Helicopters).—All types of helicopter operation, survey, freight, passenger, pest-control, publicity, aerial film and photography. Antarctic detachment—1955/56 Grahamland Expedition. Head office: 75 Wigmore Street, London, W.1. Main base, Croydon. Executives: W. H. Armstrong and R. Myhill, Capt. L. R. Lord (chief pilot) and W. S. Shippey (chief engineer). Fleet: 3 Sikorsky S-51s.

B.K.S. Air Transport, Ltd.—Scheduled passenger and freight services, charter and trooping work. Head office, 1 Marylebone High Street, London, W.1. Main bases, Southend, Newcastle and Leeds. Executives: J. W. Barnby, T. D. Keegan and C. J. Stevens. Scheduled routes: Newcastle and/or Leeds to Jersey, Isle of Man, Isle of Wight and Ostend, Southend to Leeds and Leeds to Belfast, Southend to Bilbao, Leeds to London Airport, Leeds to Glasgow and/or Edinburgh, Edinburgh to Belfast. Inclusive tours based on Southend to Corsica, Majorca, Corsica and Majorca, Malago, Barcelona, Oporto, Munich, Klagenfurt, San Sebastian, and Geneva; Newcastle-Lourdes-Newcastle, Newcastle and/or Leeds-Basle-Leeds-Newcastle, Leeds-Lourdes-Leeds, Newcastle and/or Leeds-Paris-Leeds-Newcastle. Fleet: five Dakotas and three Vikings. In 1955 B.K.S. carried 32,765 passengers and 382 short tons of freight.

One of Eagle's 17 Vikings, which are used on scheduled services to the Continent.

Britavia, Ltd.—Operators of air trooping, inclusive tour and world-wide passenger and freight charter services. Head office, 1 Great Cumberland Place, London, W.1. Main base, Blackbushe. Executives: Eoin C. Mekie (chairman), Air Commodore G. J. Powell (managing director), Colonel J. H. Willink (manager—Hermes division). Fleet: six Hermes IVas. In 1955 Britavia carried 36,847 passengers, 88 short tons of freight and flew 8,620,459 revenue short ton-miles.

Cambrian Airways, Ltd.—Scheduled passenger services, charter and army co-operation flights. Head office, Rhoose Airport, near Barry, Glamorgan. Main base, Cardiff (Rhoose). Executives: J. H. Watt (chairman), W/C. L. B. Elwin and W. W. Stanley (joint managing directors), B. J. T. Callan (commercial and operations manager), G. A. Perrott (chief pilot) and R. H. Boutcher (chief engineer). Scheduled routes: Liverpool to Cardiff-Bristol-Jersey-Guernsey; Cardiff to Paris-Jersey-Guernsey-Haverfordwest-Liverpool-Southampton; Bristol to Paris-Jersey-Guernsey-Liverpool-Southampton; Cheltenham/Gloucester to Paris-Jersey-Guernsey; Southampton to Paris-Bristol-Cardiff; Cardiff, Bristol and Southampton to Nice; Southampton-Dinard; Cardiff-Bristol-Belfast. Additional routes approved by the M.T.C.A. for future operation: Haverfordwest-Swansea-Cardiff-London and Haverfordwest-Dublin (provisional approval). Fleet: two Dakotas, three Doves, three Herons, two Rapides, three Proctors and one Auster.

Channel Airways (East Anglian Flying Services, Ltd.)—Scheduled passenger and charter services. Head office, Southend Airport, Southend. Main bases, Southend, Ipswich, Shoreham and Portsmouth. Executives: S/L. R. J. Jones (managing director) and A. E. Hugo Parsons (director-operations). Scheduled routes: Ipswich-Southend-Rochester-Shoreham-Paris; Ipswich - Southend - Rochester - Shoreham - Channel Islands; Ipswich-Southend-Ostend; Portsmouth-Shoreham-Paris; Portsmouth-Channel Islands; Shoreham-Portsmouth-Isle of Wight and Ipswich-Southend-Rotterdam (commencing Autumn 1956). Fleet: three Doves, three Rapides, two Proctors, one Tiger Moth and two Austers. In 1955 Channel Airways carried over 12,000 passengers.

Dan-Air Services, Ltd.—Passenger and freight charter, trooping and inclusive tour services. Head office, 36/38 New Broad Street, London, E.C.2. Main operating base, Blackbushe; maintenance and engineering base, Lasham Airfield. Executives: F. E. F. Newman, J. W. Davies, E. O. Wallis (directors), A. F. Austin (secretary), L. E. Moore (general manager). Fleet: one York, two Dakotas.

Derby Aviation, Ltd.—Scheduled and charter passenger services, and inclusive tours; freight carrying and flying schools. Head office, 78 Buckingham Gate, London, S.W.1. Main bases, Derby and Elstree. Executives: G/C. C. A. B. Wilcock (chairman), J. Harben (deputy chairman), W/C. H. A. Roxburgh, E. W. Phillips, R. R. Paine, A. C. Felts (secretary), K. W. Felts (chief engineer), E. W. A. Lines (chief pilot). Scheduled routes: Derby-Tollerton-Wolverhampton-Elmdon - Jersey; Derby - Tollerton - Birmingham-Ostend; Tollerton-Derby-Isle of Man; Derby-Isle of Wight. Fleet: two Dakotas, two Marathons, one Anson, two Rapides, one Gemini; light aircraft for training and photography. In 1955 Derby Aviation carried 6,200 passengers and 280 tons of freight.

Don Everall (Aviation), Ltd.—Operators of scheduled services, charter and aerial photography, advertising, ambulance services and inclusive tours to the continent. Head office, Elmdon Airport, Birmingham. Main base, Elmdon. Executives: D. Everall and C. Everall (directors), A. D. Atkinson (operations manager) and E. Holden (chief engineer). Scheduled routes: Birmingham-Leicester East-Coventry-Jersey-Guernsey; Coventry-Wolverhampton-Ronaldsway; Birmingham-Isle of Wight. Fleet: five Rapides, one Messenger. In 1955 Don Everall carried over 6,000 passengers.

Eagle Aviation, Ltd.—Operators of scheduled passenger services, charter and trooping flights. Head office, 29 Clarges Street, London, W.1. Main base, Blackbushe. Executives: H. Bamburg (managing director), A. Bamburg, N. Ashton Hill, P. C. F. Morgan and Maj-Gen. Greaves (directors), G. W. Pitt (commercial manager), W. H. Dixon (airline division) and J. K. Maunder (charter division). Routes: scheduled services from London to Dinard, Luxembourg and Innsbruck; inclusive tour services from London to Pisa, Turin, Valencia, Palma-Minorca, Nice-Corsica, Klagenfurt, Biarritz, Nice, Basle, Palma, Hamburg, Munich, Bordeaux, Venice, La Baule and Zurich. Fleet: 17 Vikings and two Dakotas.

Fison-Airwork, Ltd.—Operators of helicopters for all forms of agricultural and industrial work and for passenger or freight charters. Head office, Bourn, Cambridge. Main base, Bourn. Executives: M. D. N. Wyatt (chairman), J. E. Harper, L. A. Lafone, W. J. F. McEwen, W. E. Ripper, G. E. Wildman-Lushington (directors), and R. G. Westwood (secretary). Fleet: eight

Dan-Air's handsome York, used by the company mainly for freighting and trooping operations.

BRITISH INDEPENDENT OPERATORS . . .

Hillers and two Westland S-55s. Activities in 1955 include assisting in oil prospecting in the Persian Gulf; co-operating in oil exploration in Nigeria; air/sea rescue off the Nigerian coast; assisting in gas pipe line maintenance and construction in Pakistan; crop spraying and spraying demonstrations in the U.K.; pilot training; executive charter; joy rides from holiday camps. Associated companies overseas undertook cotton spraying and locust control in the Sudan, and locust control, malaria control and crop spraying in East Africa.

Hunting-Clan Air Transport, Ltd.—Scheduled passenger and cargo services, trooping and general charter. Head office, 72 Wigmore Street, London, W.1. Main base, London Airport. Executives: M. H. Curtis (managing director), E. H. Baker (secretary), Capt. L. B. Greensted (technical manager), D. J. Platt (commercial manager), J. Robinson (sales manager), E. P. Hessey (manager, Africa), G. B. Mollet (traffic manager), D. T. Shaw (economics controller), H. S. Tovey (chief accountant), L. V. E. Atkinson (base manager, London Airport), Capt. R. W. L. Mulliner (chief pilot and operation superintendent), H. B. Cundall (development engineer). Scheduled routes: Newcastle to Paris, London, Belfast, Amsterdam-Dusseldorf, Hamburg-Copenhagen, Stavanger-Oslo; London-Gibraltar; London-Nairobi *via* Malta, Wadi Halfa, Khartoum and Entebbe; London-Salisbury *via* Malta, Wadi Halfa, Khartoum, Entebbe, N'Dola and Lusaka; London-Accra *via* Tangier, Villa Cisneros, Dakar, Bathurst and Freetown; "Africargo" all-cargo services between the United Kingdom and East and Central Africa. Fleet: three Viscounts, nine Vikings, five Dakotas and four Yorks. On order: two Viscounts. In 1955 Hunting-Clan Air Transport carried 88,117 passengers, 686 short-tons of freight and mail and flew 10,391,934 revenue short ton-miles.

Island Air Services (London), Ltd.—Operators of general charter and passenger services and pleasure flights at London Airport. Head office, London Airport, Hounslow, Middlesex. Main base, London Airport. Executives: Monique Rendall (managing director and chief pilot), R. C. Rendall (director) and Jean Edwards (operations manager). Fleet: three Rapides. During 1955 Island Air Services operated their three Rapides solely on pleasure flights from London Airport.

Jersey Airlines (Airlines [Jersey] Ltd.)—Scheduled passenger services and charter flights. Head office, 4 The Parade, St. Helier, Jersey, Channel Islands. Main base, Jersey. Executives: M. L. Thomas (managing director) and W/C. L. A. Egglesfield (general manager). Scheduled routes: Manchester, Coventry, Southampton and Bournemouth to Channel Islands, Dinard, La Baule and Cherbourg, London-Channel Islands-St. Brieuc-Lannion-Brest, Exeter-Channel Islands, Caen and Paris and inter-Channel Islands services, Jersey-Bilbao. Fleet: three Herons (summer 1956 increasing to seven) and three Rapides. In 1955 Jersey Airlines carried 98,879 passengers, 80 short tons of freight and flew 771,795 revenue short ton-miles.

Manx Airlines, Ltd.—Scheduled services for passengers and freight; ambulance and short- and long-range charter flights. Head office, Ronaldsway Airport, Ballasalla, Isle of Man. (London brokers: James Burness and Sons, Ltd., 15 St. Helens Place, E.C.3.) Main base, Ronaldsway. Executives: G. H. Drummond (chairman), G. S. Hankinson (managing director) and T. L. Vondy (director). Scheduled routes: Isle of Man to Renfrew, Carlisle and Newcastle. Fleet: two Dakotas and three Rapides. In 1955 Manx Airlines carried 20,182 passengers, 117 short tons of freight and flew 304,590 revenue short ton-miles.

Marshall Flying Services, Ltd.—Charter and pleasure flights. Head office, The Aerodrome, Newmarket Road, Cambridge. Main base, Cambridge. Executive: A. G. G. Marshall (managing director). Fleet: four Rapides, one Autocrat and five Tiger Moths.

Morton Air Services, Ltd.—Operators of scheduled passenger services, charter and air ambulance flights. Head office, Croydon Airport, Surrey. Main base, Croydon. Executives: T. W. Morton (managing director), J. J. Fargher (secretary), P. Eskell (commercial manager) and J. Warburton (chief pilot). Scheduled routes: Croydon to Jersey, Guernsey and Le Touquet. Fleet: four Doves, three Consuls and one Rapide. In 1955 Morton Air Services carried 15,500 passengers.

Olley Air Service, Ltd.—Scheduled passenger services, charter and air ambulance. Head office. Croydon Airport, Surrey. Main base, Croydon. Executives: T. W. Morton (chairman), S. A. Carter (secretary and commercial manager) and J. Warburton (chief pilot). Scheduled routes: Croydon to Jersey/Guernsey and to race meetings. Fleet: three Doves, two Consuls and two Rapides. In 1955 Olley Air Service carried 14,000 passengers.

Scottish Airlines.—Scheduled services and charter trooping. Head office, Prestwick Airport, Ayrshire. Main bases, Prestwick and Stansted. Executives: I. C. Grant (general manager), D. McConnell (secretary), W. A. Wilkinson (technical manager) and W. M. Cummings (London manager). Scheduled routes: Prestwick-Ronaldsway. Fleet: five Yorks and one Dakota. On order: six Prestwick Twin Pioneers. In 1955 Scottish Airlines carried 31,086 passengers and 891 short tons of freight.

Silver City Airways, Ltd.—Operators of scheduled vehicle ferries, passenger services, helicopter freight services, charter and trooping flights and livestock transportation. Head office: 1 Great Cumberland Place, London, W.1. Main bases, Ferryfield, Blackbushe, Southampton and Newtownards. Executives: A. Cdre. G. J. Powell (managing director), W. G. Franklin and S. A. Tennant. Scheduled routes: Ferryfield to Ostend, Calais and Le Touquet; Southampton-Cherbourg, Deauville and Guernsey and Belfast-Stranraer. Fleet: 12 Bristol Superfreighters, eight Bristol Freighters, Rapides, Consuls, etc. In 1955 Silver City carried 166,000 passengers and 72,333 tons of freight and flew 5,205,798 revenue short-ton miles.

Skyways, Ltd., and Lancashire Aircraft Corporation.—All aeronautical services; operators of scheduled passenger services, charter, trooping and pleasure flights. Head office: 7 Berkeley Street, London, W.1. Main base, Stansted. Executives: Sir Wavell Wakefield, M.P. (chairman), Eric Rylands (managing director), Charles F. Dickson, Derek J. Bibby, Leslie O'B. Harding (directors), A. J. Henderson (secretary), J. M. Twiss (general manager—administration), H. P. Snelling (general manager-commercial), E. Barker (general manager—financial), A. Cdre. S. W. Smith (air trooping executive) and Mrs. E. Whittaker (head, public relations and assistant to managing director). Scheduled routes: Crusader service, United Kingdom-Cyprus and Malta-Cyprus; Continental Coach-Air service, London-Lympne-Beauvais-Paris. Fleet: nine Hermes; 15 Yorks, three Dakotas, five twin- and single-engined aircraft (operated by Skyways); two Dakotas, 11 twin- and single-engined aircraft (operated by Lancashire Aircraft Corporation). In 1955 Skyways carried 24,247 passengers, 2,050 short tons of freight and flew 14,233,500 revenue short ton miles; Lancashire Aircraft Corporation carried 41,762 passengers, 42 short tons of freight and flew 458,403 revenue short ton miles.

Transair, Ltd.—Scheduled passenger services, mail, freight and charter. Head office, Croydon Airport, Surrey. Main base, Croydon. Executives: G. H. Freeman (chairman and managing director), C. Nunn (supplies controller), H. S. Perren (commercial manager), C. W. H. Bebb (operations manager), D. L. Brooks (chief engineer) and W. A. Richardson (chief inspector). Scheduled routes: Croydon to Paris, and Jersey and Guernsey (newspapers and mail); Croydon to Dusseldorf, Hanover and Frankfurt (newspapers). Seasonal scheduled passenger services: Croydon-Jersey. Inclusive tour passenger services: Croydon to Basle, Barcelona, Madrid, Turin, Perpignan, Alghero, Nice, Venice and Lourdes. Fleet: ten Dakotas.

One of Transair's ten DC-3s, flown from the company's Croydon base for "Flight's" photographer. (Right) A Hermes of Skyways: the company uses nine aircraft of this type mainly for Government trooping operations.

One of T.W.A.'s Lockheed L-1049G Super Constellations flying close to Manhattan.

WORLD AIRLINE DIRECTORY

OPERATORS OF SCHEDULED PASSENGER, MAIL AND FREIGHT SERVICES

IN this and the following pages are listed all of the world's airlines which are known to be engaged in the operation of scheduled passenger, mail and freight services. Histories, fleets and traffic statistics are based on the latest information available.

The two British Airline corporations are dealt with separately on pages 456-457 and British independent operators on pages 458-460.

Aden Airways, Ltd., a wholly owned subsidiary of B.O.A.C., operate local services and international routes ranging from Cairo and Damascus in the north to Nairobi and Mombasa in the south. The company was incorporated on March 1st, 1949, and became self-accounting under its own board of directors on October 1st of that year.
Head Office: Khormaksar, Aden.
Executives: S. Broad, general manager; L. Bennett, commercial manager; R. Haseldine, secretary/accountant.
Fleet: six DC-3, one D.H.89; on order, one DC-3 (April 1956), one D.H.89.
Results for year ended March 31st, 1955: 21,505 passengers; 1,952 tons of freight and 87 tons of mail carried; 1,510,171 ton-miles flown; total costs, £714,055; total revenue, £713,145; 300 staff.

Aer Lingus, Teoranta, national airline of Eire, began operations in 1936 with a D.H.84, which was used on the Dublin - Isle of Man route. Sixty per cent of the company's shares are owned by Aer Rianta, the Irish Government holding company, and 40 per cent by B.E.A. Under the terms of the 1946 Anglo - Irish bilateral agreement Aer Lingus at present has the monopoly of all routes between the Republic of Ireland and Britain. From Dublin Airport, main base of Aer Lingus, the network extends from Edinburgh and Glasgow in the north to Manchester, London and Amsterdam in the east and southwards to Paris, Jersey and Dinard.
Head Office: Dublin, Republic of Ireland.
Executives: P. Lynch, chairman; J. F. Dempsey, general manager; Capt. J. C. Kelly-Rogers, deputy general manager; M. Stuart-Shaw, asst. general manager: Capt. W. J. Scott, operations manager; O. Hone, traffic manager.
Fleet: four Viscount 707, 13 DC-3, two Bristol 170; on order three Viscount 808, Friendship.
Results for year ended December 31st, 1955: 381,721 passengers; 4,946 tons of freight and 1,812 tons of mail carried; 9,575,777 ton-miles flown; 1,619 staff. Financial details not available.

Aero O/Y—Finnair was founded in 1923 and began operations, with single-engined Junkers XIII floatplanes, in 1924. Landplane operations began in 1936 when airports became available. After the war Aero O/Y developed its European routes which culminated in the opening of a service to London in 1954. The Finnish internal network is one of the most extensive in Europe, fares are very low and the growth of traffic in recent years has been phenomenal. The company has an extremely high reputation for regularity and punctuality.
Head Office: Helsinki, Finland.
Executives: L. Grandell, president; B. Aulin, vice-president technical; A. Nyström, vice-president commercial.
Fleet: three Convair CV-340, 10 DC-3; on order one CV-440 (1956).
Results for year ended December 31st, 1955: 272,581 passengers; 1,192 tons of freight and 404 tons of mail carried; 19,429,891 ton-miles flown; financial details not available; 838 staff.

Aeroflot-Grazdanskij Wozdusznyj Flot is the Soviet airline, but it is not truly comparable with the airlines of the West, as in addition to operating passenger, freight and mail services, it is responsible for all aspects of civil aviation. Among its many activities are agricultural, survey and ambulance flying. In 1929 the pioneer Soviet airlines were amalgamated to form Dobrolet, which in 1932 was reorganized and became Aeroflot. The airline now operates an extensive route network within the U.S.S.R. (reported to total 230,000 route miles), routes to neighbouring Communist countries and to Helsinki and Kabul. Services between Moscow and Stockholm are to open soon. Jet aircraft are in service.
Head Office: Moscow, U.S.S.R.
Executives: Marshal Zhavoronkov, director general; Lt. Gen. N. A. Zakharov, deputy director general.
Fleet: Tu-104, Il-12, Li-2, An-2, Po-2, Il-20, Yak 12R and other types. Il-20 turbojet-powered aircraft are operating domestic mail and freight services.

Aerolineas Argentinas E.N.T., or Argentine Airlines as it is more generally known, was founded as a state corporation in May 1949 by the Ministry of Transport to take over the operations of FAMA, ALFA, Aeroposta and ZONDA. The airline maintains a domestic network and international services to neighbouring South American countries, Cuba, the U.S.A. and Europe.
Head Office: Buenos Aires, Argentina.
Executives: Not available.
Fleet: six DC-6, five DC-4, five Convair 240, 18 DC-3, six Sandringham.
Results for year ended December 31st, 1954: 291,988 passengers; 2,835,000 freight ton-km and 2,039,000 mail ton-km flown; total ton-km 37,567,000; 5,486 staff. Financial details not available.

Aéromaritime—see Union Aéromaritime de Transport.

WORLD AIRLINE DIRECTORY . . .

Aeronaves de Mexico, S.A. was founded on September 1st, 1934, and began operating between Mexico City and Acapulco. Its early fleet consisted of a three-engined Stinson, three Bellanca Pacemakers and a Fairchild 24. The airline now has a route network of about 6,000 miles within Mexico. In 1952 Aeronaves bought LAMSA (founded in 1934) from United Air Lines and in 1954 the company also acquired Aerovias Reforma, which had been founded in 1945.

Head Office: Mexico City, Mexico.
Executives: A. D. Lombardo, president; C. Ramos, general manager; R. L. Johnson, operations manager.
Fleet: 20 DC-3, one DC-4, four Convair 340.
Results for year ended December 31st, 1954: (including Aerovias Reforma). 213,248 passengers; 1,700 tons of freight and 195 tons of mail carried. Other details not available.

Aero-Nord Sweden A.B., operates scheduled newspaper and limited passenger services within Sweden.

Head Office: Stockholm, Sweden.
Executives: P-S. Holmström, managing director.
Fleet: one Lodestar, one Oxford, two Piper Cub; on order one Lodestar, five Piper Cub (April 1956).
Results for year ended December 31st, 1955: 117,523 ton-km flown; 14 staff.
No other details available.

Aeronorte—Empresa de Transportes Aereos Norte do Brasil, S.A., began operations in 1950 and operates a network of feeder services in the north-east of the country. Percival Prince aircraft were used originally but the present schedules are worked by DC-3s. In 1953 Real acquired control of the company but Aeronorte works as a separate division. By early 1955 the Aeronorte route mileage exceeded 4,000 miles.
Head Office: Sao Luiz, Brazil.
Executives: names not available.
Fleet: DC-3.
Traffic statistics not available.

Aerotaxi—see Aérovias Nacionales de Colombia.

Aero Transportes, S.A.—ATSA. Founded in 1943 and began scheduled services in 1944. Services were suspended in the following year and resumed in January 1947. The company now operates a daily DC-4 service between Monterrey and Brownsville/Matamoros.
Head Office: Mexico City, Mexico.
Executives: R. O'Farrill, president; H. J. Filshinger, general manager; J. P. Centella, sales manager.
Fleet: DC-4.
Traffic statistics not available.

Aérovias Nacionales de Colombia — AVIANCA claims to be the oldest airline in the Americas—and, in fact, it was formed (in 1940) as the result of a merger of S.C.A.D.T.A. (founded in 1919) and Servicio Aereo Colombiano. S.C.A.D.T.A. was founded by German interests but in 1931 Pan American Airways acquired an 80 per cent interest—which was, however, reduced to 64 per cent at the time of the merger. The company operates domestic services and services to Venezuela, Ecuador, Jamaica, the U.S.A., Bermuda, Portugal, Spain, France and Germany. In 1951 Avianca acquired the second largest Colombian airline LANSA and in 1952 also took over SAETA. A wholly owned subsidiary, Aerotaxi Ltda, operates Cessna 195 and Beaver aircraft to areas which cannot be served by larger aircraft.
Head Office: Bogotá, Colombia.
Executives: J. G. R. Jaramillo, president; J. A. González, executive vice-president; F. Carrizosa, financial vice-president; S. Pretelt, administrative vice-president; H. Wild, vice-president traffic and sales.
Fleet: four L-1049G, one L-749A, 13 DC-4, 23 Hi-per DC-3 and 11 C-47.
Results for year ended December 31st, 1955: 918,921 passengers; 67,845 tons of freight and 659 tons of mail carried; 71,328,092 ton-km flown; total costs, £12,170,885; total revenue £12,881,191; 5,000 staff.

An Air France Lockheed L-749 Constellation at Beirut International Airport.

Aerovias Panama Airways was founded in 1951 as Aerovias Interamericanas de Panama, S.A. (Avispa), and began operations mainly as a cargo carrier using C-46s leased from the Colombian company Lineas Interamericanas. In 1952 the company was designated by the Panama Government to operate a Panama - Miami route. In 1954 the airline concluded an agreement with Trans-Caribbean Airways whereby a DC-6 and flight crews would be supplied for the Miami service. The route has now been opened and is flown twice weekly in each direction.
Head Office: New York, U.S.A.
Executives: H. Barletta, president; V. Inchausti, secretary/treasurer/operations manager.
Fleet: DC-6 supplied by Trans-Caribbean Airways.
Traffic statistics not available.

Aerovias "Q," S.A.—"Q" Airways, was founded in October 1945 and began operations in 1946 to Key West and Gerona. Present operations are from Havana to West Palm Beach, Florida, twice a week with DC-3s; to Gerona, Isle of Pines, twice on weekdays with DC-3s; and to Key West, Florida, thrice on weekdays with C-46s.
Head Office: Havana, Cuba.
Executives: M. Cuevedo, president/general manager; M. Rodriquez, traffic manager; J. E. A. de Rogato, operations manager.
Fleet: DC-3, three C-46.
Traffic statistics not available.

Aerovias Sud Americana, Inc., was founded in 1949 as a contract cargo carrier operating a route from Tampa, Florida, to Havana. Scheduled services were begun in December 1952 with routes extending as far south as Bogotá in Colombia.
Head Office: St. Petersburg, Florida, U.S.A.
Executives: V. V. Carmichael Jnr., president and general manager; D. M. Benson, vice-president/director flying; R. C. Minor, vice-president maintenance; P. E. Dixon Jnr., vice-president sales; J. D. Rains, secretary/treasurer.
Fleet: six Curtiss C-46.
Results for year ended December 31st, 1955: 5,880,055 freight ton-miles flown; total costs, £691,528; total revenue, £696,494; 129 staff.

Aerovias Venezolanas, S.A.—AVENSA., operates domestic passenger and freight services with DC-3s and Convairs; two Convair services a week between Venezuela and Miami *via* Jamaica; and a weekly C-46 operated cargo service from Caracas to Miami, returning *via* Kingston. The company was formed in 1943 by Venezuelan interests and Pan American Airways. Regular services were begun in 1944. LAV is believed to have a financial interest in AVENSA.
Head Office: Caracas, Venezuela.
Executives: H. L. Boulton, president; A. Boulton, acting president/general manager; G. O. Tucker, vice-president operations.
Fleet: three Convair 340, three DC-4, 19 DC-3, two C-46.
In the year June 1953-May 1954 nearly 250,000 passengers were carried.

Air Algérie—see Compagnie Générale de Transports Aériens Air Algérie.

Air Atlas-Air Maroc. Compagnie Chérifienne de Transports Aériens, operates services in North Africa and between North Africa and France, Spain and Switzerland. The airline was founded in 1953 by the amalgamation of the Casablanca-based Air Atlas and Air Maroc companies. Air Atlas was formed in 1946 and began operations with Junkers Ju 52/3ms and Air Maroc was founded in 1947 and began scheduled services in 1949.
Head Office: Casablanca, Morocco.
Executive: Gen. C. Molinier, president/general manager.
Fleet: three DC-4, six DC-3.
In 1953 nearly 90,000 passengers were carried.

Air Ceylon, Ltd., founded by the Ceylon Government in 1947, in that year opened services between Ceylon and India. In 1949 a route to London was opened. In 1951 Air Ceylon was made an independent company with the Government holding 51 per cent of the stock and Australian National Airways holding 49 per cent. A route to Australia was opened, thus providing a through Australia - Ceylon - London service; this route was abandoned in 1953 but in co-operation with K.L.M. the route to Europe (serving London and Amsterdam) was reopened this year.
Head Office: Colombo, Ceylon.
Executives: J. L. M. Fernando, managing director; K. de Croos, manager/secretary; F. B. W. Goonewardena, accountant; W. A. E. Molamure, chief engineer; P. B. Mawalagedera, chief pilot.
Fleet: two DC-3.
Results for year ended December 31st, 1955: 26,286 passengers; 264.5 tons of freight and 11.6 tons of mail carried; 880,490 ton-km flown; total revenue £1,075,940; 200 staff. Costs not available.

Air France—see Compagnie Nationale AIR FRANCE.

Air-India International was formed as a limited company in June 1948 with Air-India Ltd. holding 51 per cent of the shares and the Government of India 49 per cent. On August 1st, 1953, A.I.I. became a State-owned corporation with the continuing responsibility of operating Indian long-distance international air services.

The company began operation of a weekly Bombay-Cairo-Geneva-London service in June 1948. A.I.I. now operates six weekly services between India and England. Rome, Paris, Zürich, Düsseldorf and Beirut have been added as calls on this route while Delhi and Calcutta have been added as Indian terminals. The airline also operates services to Bangkok, Hongkong, Tokyo, Madras, Singapore, Karachi, Aden and Nairobi. Prague and Damascus have been added to the routes this year and the airline has plans to operate North Atlantic services, probably in 1957.
Head Office: Bombay, India.
Executives: J. R. D. Tata, chairman (portrait, p. 483); B. R. Patel, vice-chmn./gen. mgr.; S. K. Kooka, traffic manager; A. C. Gazdar, operations and engineering manager; N. J. Pavri, controller of accounts.
Fleet: three L-749 Constellations, five L-1049, one DC-3; on order, three L-1049G (1956/57).
Results for year ended December 31st, 1955:

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We decided early on to go right back to fundamentals. So, in 1947, at Liverpool, we built the largest gas turbine research station in Europe. In it we have done 8 years' continuous work on compressor and turbine design techniques. In it we have developed a unique engine control system which guarantees that the Eland turbines will never have to meet higher temperatures than they have already met for thousands of hours on test-bed and in the air. The performance and safety and flexibility of the Eland rest upon sure foundations.

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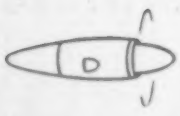

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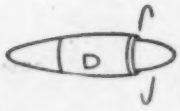

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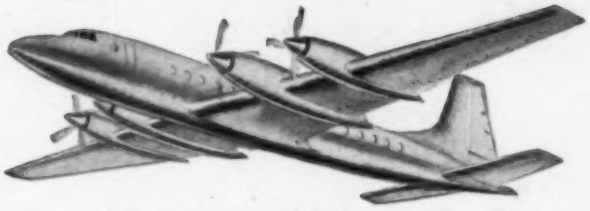

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WORLD AIRLINE DIRECTORY . . .

55,772 passengers; 1,320 tons of freight and 440 tons of mail carried; other details not available.

Air Jordan Co., Ltd., was founded in 1950 by local interests and services were begun with Airspeed Consuls. In 1953 Transocean Air Lines acquired an interest in Air Jordan and DC-3s were introduced. The airline now operates from Jerusalem and/or Amman to Aqaba, Cairo, Damascus, Beirut and Dhahranm.
Head Office: Amman, Jordan.
Executives: A. Z. Nuseibeh, chairman; A. M. el-Qutob, general manager; S. R. Kochenderfer, executive director.
Fleet: DC-3 and Curtiss C-46. Other details not available.

Air Laos was formed in 1952 by Air France, Aigle Azur and local interests. Air France subscribed 30 per cent of the original stock and Aigle Azur 20 per cent. Services are operated from Vientiane to a number of places in Laos and to Saigon, Bangkok and Hong Kong.
Head Office: Vientiane, Indo-China.
Executives: not available.
Fleet: DC-3, Bristol 170, Stratoliner.
In its first year the airline carried more than 16,000 passengers.

Air Liban was founded in 1945 as Compagnie Générale de Transport and took its present title in 1951. Air Liban is an associate of Air France and operates services between Beirut and Accra, Aleppo, Baghdad, Bahrein, Cairo, Doha, Fort Lamy, Istanbul, Jerusalem, Jeddah, Khartoum, Kuwait, Lagos and Nicosia.
Head Office: Beirut, Lebanon.
Executive: B. Méguerdiche, director general.
Fleet: four DC-3, two DC-4, one Languedoc, two York.
Results for year ended December 31st, 1955: 49,394 passengers; 1,234 tons of freight and 28.9 tons of mail carried; 6,074,261 ton-km flown; 267 staff. Financial details not available.

Airlines (W.A.), Ltd.—see MacRobertson-Miller Airlines, Ltd.

Air Madagascar operates a network of services within Madagascar.
Head Office: Tananarive, Madagascar.
Fleet: D.H.89.

Airtaco A.B. was founded in 1934 as A. B. Bjorkvallaflyg and in 1944 became Skandinaviska Aero A.B. (Scandinavian Airways Ltd.). Later S.A.S. paid the company about £10,000 to change its name, since when it has operated as Airtaco. Newspaper services are flown from Stockholm to Sundsvall/Härnösand, Karlstad, Trollhättan, Gothenburg, Alvesta, Malmö and other Swedish destinations and the company is allowed to carry passengers to Stockholm on the return flights from some of the points served. Charter and ambulance work is also undertaken.
Head Office: Stockholm, Sweden.
Executives: A. Forsmark, managing director; T. Andersson, operations manager.
Fleet: DC-3, Lodestar, Lockheed 12A.
Other details not available.

Air Vietnam was founded in 1951 to take over domestic and regional services previously operated by Air France. The Vietnamese Government holds 50 per cent of the stock and Air France holds 33 per cent. Air Vietnam flies domestic services and to Laos, Hong Kong and Bangkok. In collaboration with U.A.T. a weekly DC-6B service is flown from Saigon to Paris *via* Karachi and Beirut. Air Vietnam does much non-scheduled flying.
Head Office: Saigon, Indo-China.
Executives: N. Van Tri, president; L. C. Trinh, manager.
Fleet: two DC-3, two DC-4, five Bristol 170.
Results for year ended December 31st, 1954: 75,924 passengers; 2,041,000 freight ton-km and 439,000 mail ton-km flown; total ton-km 6,937,000; 825 staff. Financial details not available.

Alaska Airlines, Inc., adopted its present title in 1944, having been founded in 1937 as Star Air Lines Inc., to take over Star Air Service, which had been doing charter work for several years; the latter had acquired McGee Airways, which was founded in 1932. In 1942 and 1943 Star Air Lines took over Pollack Air Lines, Lavery Airways and Mirow Air Service. Alaska Airlines, which has an extensive Alaskan route system and also serves Seattle and Portland, still uses the title "Route of the Starliners."
Head Office: Seattle, Washington, U.S.A.
Executives: N. David, president/general manager; H. W. Robinson, chairman; R. J. Norris, treasurer.
Fleet: two DC-4, three DC-3, two C-46, one Lodestar and other small aircraft.
Results for year ended December 31st, 1954: 29,000 passengers; 2,750,000 freight and mail ton-miles flown; total ton-miles 4,500,000. Other details not available.

A Lockheed Lodestar of Aero-Nord Sweden at Kabul, Afghanistan.

Alaska Coastal Airlines operate a network of domestic services based on Juneau. The airline was formed in 1939 as a partnership by Alaska Air Transport, founded in 1935, and Marine Airways, founded in the following year.
Head Office: Juneau, Alaska.
Executives: S. B. Simmons and O. F. Benecke, co-managers.
Fleet: nine Goose, one Canso, two Widgeon, one Seabee, one Aeronca Super Chief, one Bellanca Pacemaker, one Lockheed Vega.
Results for year ended December 31st, 1954: 45,500 passengers; 1,100 tons of freight and mail carried; total revenue ton-miles 475,000. Other details not available.

Alitalia — Aerolinee Italiane Internazionali was formed in 1946 as a joint British-Italian venture with B.E.A. holding 30 per cent of the original capital. Additional capital was called up in 1955 and B.E.A. sold one-third of its investment to B.O.A.C. Operating in pool with B.E.A. on certain European routes, Alitalia operates long-distance services to the Argentine, Venezuela, Italian and British Somaliland. Its shorter routes serve London, Paris, Tripoli, Nice, Geneva, Athens, Beirut and Frankfurt. There are also some domestic services linking Rome, Milan, Turin and Catania. A London-Venice service is to be introduced this summer. Alitalia made a profit of £133,000 in its financial year 1954-1955.
Head Office: Rome, Italy.
Executives: Count Dr. N. Carandini, chairman (portrait, p. 484); Ing B. Velani, gen. mgr.; Dr. D. Saracino, administration manager; R. Cappelletti, commercial manager.
Fleet: six DC-6B, four Convair 340; on order, four DC-7C (1958), two Convair 440 (1957).
Results for year ended December 31st, 1955: 17,168,276 passenger-km flown; 1,377,926 freight ton-km and 1,192,695 mail ton-km flown; total ton-km, 20,644,754; 805 staff. Financial details not available.

Allegheny Airlines, Inc., was founded in 1937 as All-American Airways. That company pioneered "pick up" air mail services using Stinson Reliants with collection attachments. These services were worked under contract with the post office and from 1940 under C.A.B. certification. By 1946 nearly 6,000 miles a day were being flown at 94 per cent regularity. The system extended from Philadelphia in the east to Cincinnati in the west and Charleston in the south to Jameston, N.Y., in the north. There were four flights a day. The service was withdrawn in 1949 after nearly 15 million miles had been flown. All-American began normal scheduled passenger services in 1949, and became Allegheny Airlines in 1953. 2,000 miles of unduplicated routes are now operated in Pennsylvania, New York, New Jersey, Maryland, Delaware, Ohio and West Virginia.
Head Office: Washington, D.C., U.S.A.
Executives: L. O. Barnes, president; E. K. Arnold, vice-president/secretary; D. L. Miller, vice-president traffic and sales; W. J. Short, vice-president/treasurer.
Fleet: 14 DC-3, three Martin 2-0-2; on order two Martin 2-0-2 (early 1956).

The S.N.C.A.S.E. Caravelle prototype taking-off. Air France has 12 on order.

An Air France Bréguet Provence—of which the company owns 12—at Algiers.

WORLD AIRLINE DIRECTORY . . .

Results for year ended December 31st, 1955: 346,174 passengers; 1,347 tons of express and 610 tons of mail carried; 5,582,253 ton-miles flown; total costs £2,052,946; total revenue £1,982,681, 601 staff.

Aloha Airline—see Trans-Pacific Airlines, Ltd.

American Airlines, Inc., which carries more passengers annually than any other airline, was founded in 1934 as successor to American Airways which had come into existence in 1930 to integrate the operations of more than a dozen operators. The present-day organization is a vast undertaking and in 1955 its fleet of 186 aircraft carried more than seven million passengers and well over 100,000 tons of freight and mail. The airline has nearly 100 aircraft on order at the present time. Its route system stretches from coast to coast, into Canada and south to Mexico, while throughplane agreements stretch the network southeast from Dallas to Miami. American operates no less than five daily nonstop and six one-stop coast to coast DC-7 flights in each direction and four one-stop DC-6 aircoach services. There are nine daily nonstop services between Chicago and Los Angeles.
Head Office: New York, U.S.A.
Executives: C. R. Smith, president; W. J. Hogan, snr. vice-president finance; C. W. Jacob, snr. vice-president/secretary; O. M. Mosier, snr. vice-president operations; C. R. Speers, snr. vice-president sales.
Fleet: 74 Convair 240, 78 DC-6 type, 25 DC-7, nine DC-4; on order, 30 Boeing 707, 35 Electra, 16 DC-6 type, 14 DC-7.
Results for year ended December 31st, 1955: 7,314,846 passengers; 84,110 tons of freight and 23,758 tons of mail carried; 520,836,925 ton-miles flown; total costs (preliminary), £79,098,647; total revenue (preliminary), £93,127,377; 18,891 staff (including AA de Mexico).

Ansett Airways Pty., Ltd., was founded by R. M. Ansett in 1936 and the airline's first service was opened that year between Melbourne and Hamilton, the route over which Ansett had previously operated road services. The company's route mileage now exceeds 2,000. The original route is still covered and services are operated with land aircraft from Melbourne to Tasmania, Adelaide, Sydney, Brisbane and other points as far north as Cairns. In 1952 Ansett took over the flying-boat operator Barrier Reef Airways and in 1953 acquired some of the routes of another flying-boat operator Trans Oceanic Airways. Ansett now operates Sandringhams between Sydney and Hobart; from Sydney to Grafton; from Sydney to Lord Howe Island; and from both Sydney and Brisbane to Hayman Island.
Head Office: Melbourne, Victoria, Australia.
Executives: R. M. Ansett, chairman; R. D. Collins, general manager; J. R. Fowler, operations superintendent.
Fleet: six DC-3, two Convair 340, two Sandringham.
Results for year ended June 30, 1954: 152,036 passengers; 5,346 tons of freight and 19.6 tons of mail carried; 500 staff.
Financial details not available.

Arab Airways (Jerusalem), Ltd., successor to Arab Airways Association, was founded in 1953, and B.O.A.C. has a minority interest through its subsidiary Aden Airways, which holds 49 per cent of the shares in Arab Airways. Services are operated within Jordan and to Iraq, the Lebanon, Egypt, Saudi Arabia and Aden.
The company's losses on its first and second years of operation were respectively £25,562 and £6,980.
Head Office: Amman, Jordan.
Executives: M. A. Bdeir, chairman; Sir Duncan Cumming, S. As'ad, M. Madi, Sheikh N. Alamuddin, A. Alauddin, board members; W. Salamen, manager; H. H. Pusey, resident adviser.
Fleet: three DC-3.
Results for year ended December 31st, 1955: 19,882 passengers; 229 tons of freight and 24.5 tons of mail carried; 742,376 ton-miles flown; 84 staff; financial details not available.

Arctic Wings—see Trans-Air, Ltd.

Arkia, Israel Inland Airlines, Ltd. Founded in 1950 by El Al and Kanfot, a company owned by the General Federation of Labour. At present the only scheduled operation is the thrice-weekly service over the 178 miles from Tel Aviv/Yafo to Elath at the head of the Gulf of Aqaba.
Head Office: Tel Aviv, Israel.
Executives: J. Hozman, managing director; K. Eisinger, technical manager.
Fleet: one Curtiss C-46; on order, two DC-3.
Results for year ended December 31st, 1955: 11,708 passengers; 343 tons of freight and three tons of mail carried; 67,080 ton-miles flown; 16 staff. Financial details not available.

Aryana Airlines Co., Ltd., was founded in 1955 with the assistance of Indamer Co., Ltd., which holds 49 per cent of the stock. The Afghanistan Government has a 51 per cent interest. Previously Indamer had held an Afghanistan Government contract for the carriage of pilgrims to Jeddah. The Indian company will be responsible for technical and operational matters and for training Afghan staff. Services are operated within Afghanistan and to Iran and Bahrein.
Head Office: Kabul, Afghanistan.
Executives: F. Mahomed, president; P. Baldwin (managing director of Indamer), vice-president.
Fleet: three DC-3.
No traffic statistics yet available.

ATSA—see Aero Transportes, S.A.

Australian National Airways Pty., Ltd., is the largest privately owned Australian airline, It was incorporated in 1936 but can trace its origin to 1932, when Holyman Brothers Pty. opened services in Tasmania with a Fox Moth. A.N.A. and its predecessor were the first to operate DC-2s in Australia. The company took an interest in Cathay Pacific Airways in 1948 and also entered into partnership with Air Ceylon as a result of which A.N.A. was flying DC-4s between Australia and the United Kingdom *via* Ceylon. The airline now operates an extensive network in Australia serving all the main cities, many more isolated areas, and also Tasmania. On many routes A.N.A. is in competition with T.A.A. In 1948 A.N.A. was concerned with others in the formation of Air Beef Pty., Ltd., which has been carrying heavy loads of carcases from the Kimberley district to Wyndham on the northwest coast.
Head Office: Melbourne, Victoria, Australia.
Executives: Capt. I. N. Holyman, mg. dir. (portrait, p. 483); F. Kay, general manager; G. H. Archibald, operations manager; J. O. Declerck, secretary/finance manager; I. G. Webster, traffic and sales manager.
Fleet: two DC-6B, two DC-6, eight DC-4, 16 DC-3, three Bristol 170, one Bristol 171; on order two DC-6B (late 1956).
Results for year ended December 31st, 1955: 632,509 passengers; 36,326 tons of freight and 816 tons of mail carried; 22,363,268 ton-miles flown; 3,582 staff.
Financial details not available.

AVENSA—see Aerovias Venezolanas, S.A.

Aviacion Y Comercio, S.A. (AVIACO), was founded as a private nonscheduled operator in 1940, scheduled operations began in 1950. Routes radiate from Madrid to 11 points on the Spanish mainland and from Madrid and Barcelona to Majorca. In North Africa, Tetuan, Casablanca, Oran and Algiers are served; there are also services from Spain and Casablanca to Las Palmas and Tenerife. A.Y.C. also operates a Marseilles - Majorca service. The company has also operated services from Spain to Brussels and Amsterdam and to West Africa and Spanish Guinea, but these have been discontinued.
Head Office: Madrid, Spain.
Executives: J. P. Montes, managing director; E. O'Connor, operations manager; F. MacLennan, commercial manager; J. Nedal, chief engineer; J. Inchausti, traffic director.
Fleet: six Bristol 170, four Languedoc.
Results for year ended December 31st, 1955: 219,619 passengers; 947.5 tons of freight and 859.5 tons of mail carried; 791,984 ton-km flown; 435 staff. Financial details not available.

AVIANCA—see Aérovias Nacioñales de Colombia.

AVIATECA—see Empresa Guatemalteca de Aviacion.

Bahamas Airways, Ltd., was founded in 1936 to take over the operation of inter-island charter services begun in 1933. In 1943 Pan American Airways acquired a 45 per cent interest in the company but in 1949 Bahamas Airways was taken over by B.S.A.A. and the airline is now a wholly owned B.O.A.C. subsidiary. Local inter-island services are operated and there is a daily Heron service between West End, Grand Bahama Island, and Miami.
Head Office: Nassau, Bahamas, B.W.I.
Executives: H. G. Christie, chairman; H. W. Woodman, commercial manager.
Fleet: two Heron, four Goose, one Widgeon, one Seabee.
Traffic statistics not available.
In the financial year 1954-55 the company incurred a loss of £21,400.

Bonanza Airlines, Inc., was founded in 1945 and began service between Las Vegas and Reno in 1946. With 10 years of experience the company is now operating about 1,200 miles of

The Australian National Airways' Douglas DC-6B "Bungana" loading at Adelaide.

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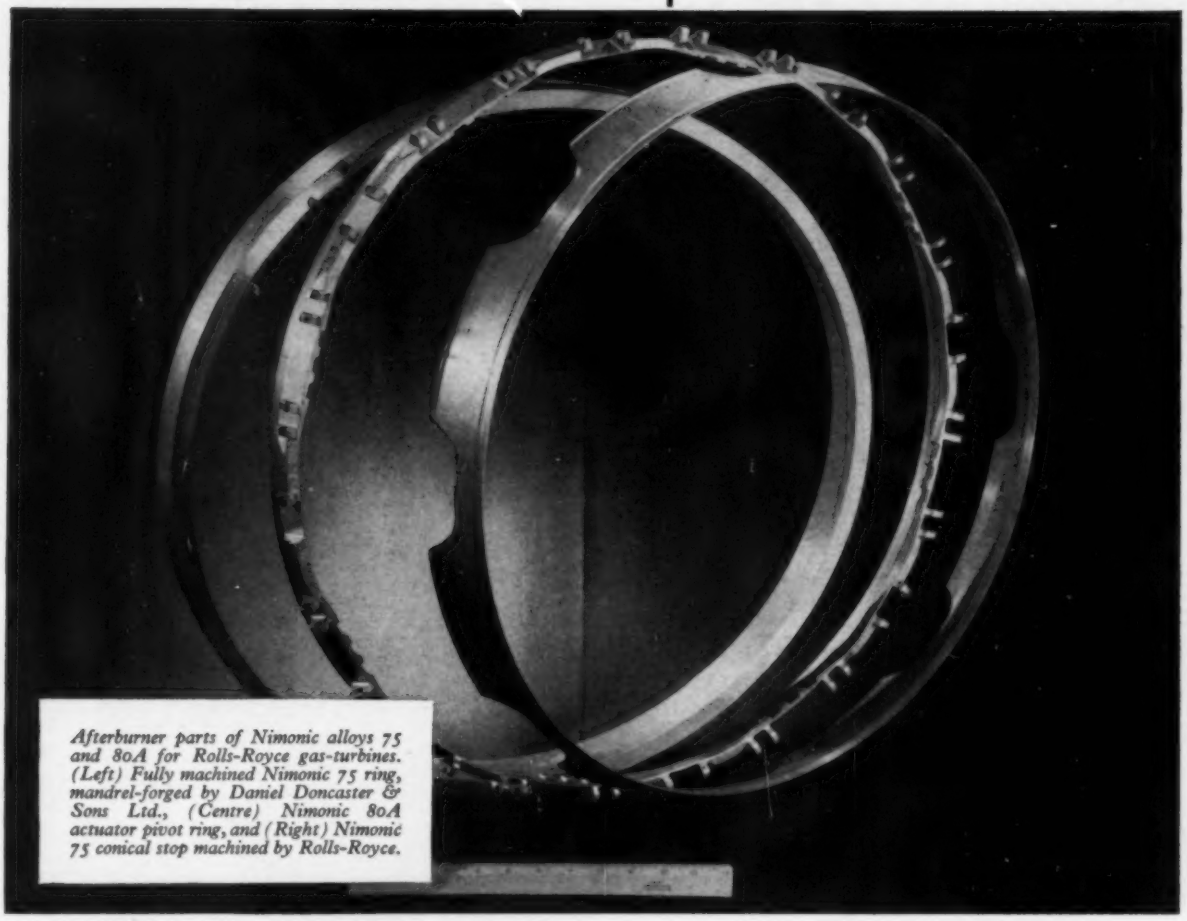

Afterburner parts of Nimonic alloys 75 and 80A for Rolls-Royce gas-turbines. (Left) Fully machined Nimonic 75 ring, mandrel-forged by Daniel Doncaster & Sons Ltd., (Centre) Nimonic 80A actuator pivot ring, and (Right) Nimonic 75 conical stop machined by Rolls-Royce.

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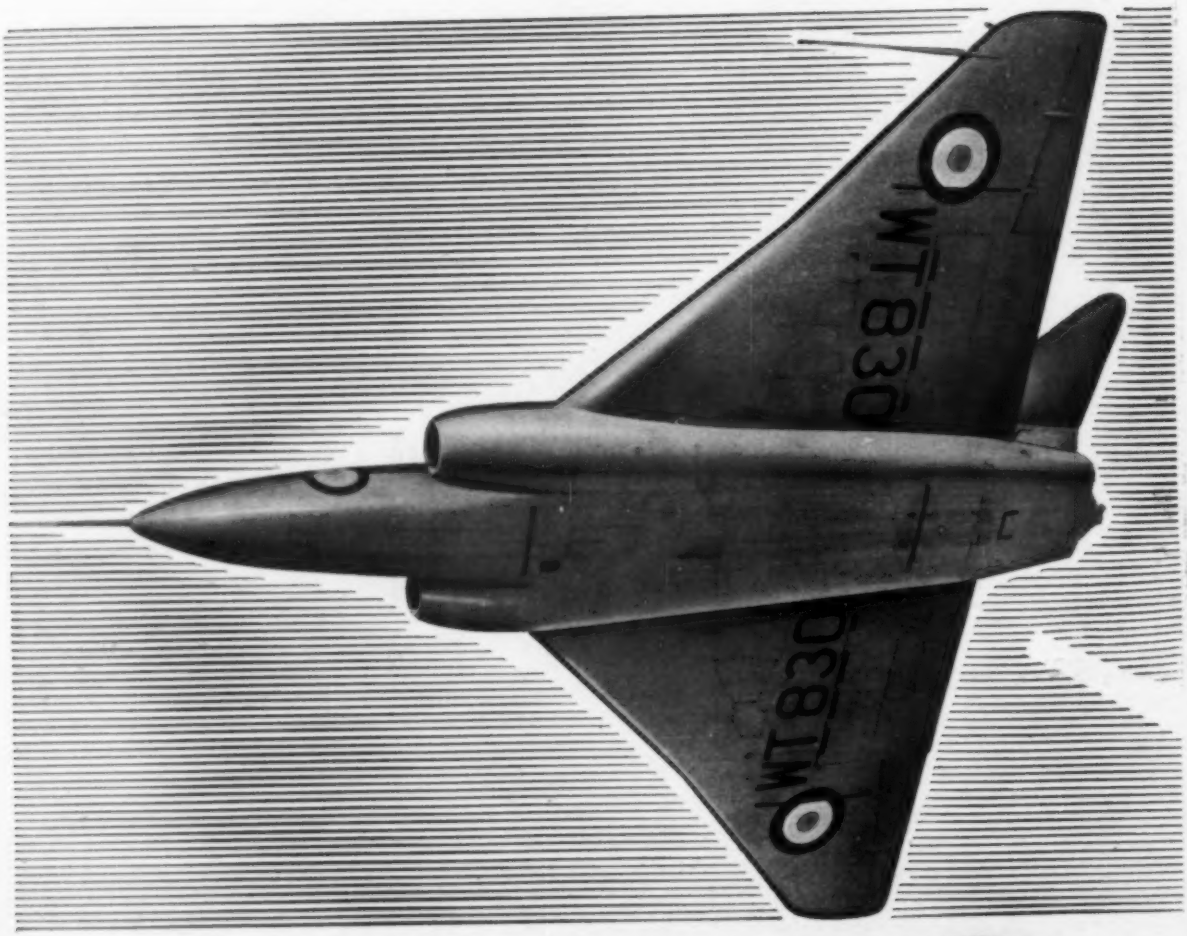

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WORLD AIRLINE DIRECTORY . . .

routes in Nevada, Arizona and southern California.
Head Office: Las Vegas, Nevada, U.S.A.
Executives: E. Converse, president; Florence Murphy; vice-president/secretary; R. H. Herrnstein, treasurer; G. R. Henry, executive vice-president/general counsel; M. W. Reynolds, vice-president operations.
Fleet: nine DC-3.
Results for year ended December 31st, 1955: 103,082 passengers; 284.8 tons of freight and 209.6 tons of mail carried; 2,285,818 ton-miles flown; total costs £865,444, total revenue, £857,467; 296 staff. Financial details are preliminary.

Braathens South American and Far East Airtransport A/S. (S.A.F.E.) was formed in 1946 by the Norwegian Braathen shipping concern for the operation of long-distance charter services. Following non-scheduled flights to the Far East the company operated regular scheduled services between Norway and Hong Kong from 1949 until early in 1954, when the licence was not renewed by the Norwegian Government. The company now operates scheduled internal services with Herons from Oslo to Trondheim and in the area between Oslo and Stavanger. S.A.F.E. also collaborates with Loftleidir in the operation of its Europe - Iceland - North America services.
Head Office: Oslo, Norway.
Executives: L. G. Braathen, director; B. G. Braathen, director; E. Fröysaa, commercial manager; J. Raad, operations manager.
Fleet: two DC-4, one DC-3, four Heron; on order one Viscount (May 1956).
Results for year ended December 31st, 1955: 23,941 passengers; 353.4 tons of freight and mail carried; 699,120 ton-miles flown; 300 staff. Financial details not available.

Braniff International Airways Inc. The original Braniff company was founded in 1928 by Paul and Tom Braniff; and the line's first aeroplane, a Stinson Detroiter, bore the title Tulsa-Oklahoma City Airline on its fuselage. In 1929 the airline became part of the Universal Aviation Corporation and in 1930 Braniff Airways was organized as an independent company. The word International was added to the title in 1948, when services were begun to Havana and Lima. The airline now operates more than 15,000 miles of routes in the United States and to South America. The South American routes are *via* the west coast to Lima, from where they branch to Sao Paulo and Rio de Janeiro, La Paz, Asuncion and Buenos Aires. In 1952 Mid-Continent Airlines was merged with Braniff.
Head Office: Dallas, Texas, U.S.A.
Executives: C. E. Beard, president; J. W. Miller, executive vice-president; R. V. Carleton, vice-president operations; O. W. Crane, treasurer.
Fleet: nine DC-6, 26 Convair 340, 24 DC-3; on order seven DC-7C, Convair 440, nine Lockheed Electra, five Boeing 707.
Results for year ended December 31st, 1954: 1,498,098 passengers; 7,670,000 freight ton-km and 3,506,000 mail ton-km flown; total ton-km 99,467,000; 3,906 staff.
Financial details not available.

Brazilian International Airlines—see Empresa de Transportes Aerovias Brasil, S.A.

British Colonial Airlines, Inc., was incorporated in March 1952 and scheduled operations were begun in August that year. Scheduled services are operated from Belize north to Chetumal, just across the Mexican border, and south from Belize along a coastal route to Punta Gorda *via* eight intermediate points. Non-scheduled operations serve a score of other places in the territory.
Head Office: Belize, British Honduras.
Executives: J. L. Freiburg, president; H. A. Freiburg, R. H. Eyles, T. S. Baker, vice-presidents.
Fleet: Cessna 170.
Traffic statistics not available.

British European Airways Corporation—see page 457.

British Guiana Airways, Ltd. In 1934 A. J. Williams, a U.S. citizen, began charter operations in British Guiana with a single-engined Ireland flying-boat. British Guiana Airways was founded by Mr. Williams to operate regular subsidized services in 1939. The company now flies numerous domestic services and also operates flying-boat services from British Guiana to Trinidad, Grenada, St. Lucia, Barbados, St. Vincent, Martinique and Dominica.
Head Office: Georgetown, British Guiana.
Executives: Lt-Col. A. J. Williams, O.B.E., managing director; H. E. Wendt, general manager.
Fleet: three DC-3, two Goose.
In 1953 the company carried more than 3,500 passengers.

British Overseas Airways Corporation—see page 456.

British West Indian Airways, Ltd., is a wholly owned subsidiary of B.O.A.C. The original concern was organized in 1940 and began operations with one Lodestar. In 1947 British South American Airways acquired control of B.W.I.A. and this passed to B.O.A.C. when it took over B.S.A.A. In 1949 B.O.A.C. took over British Caribbean Airways and merged its operations with those of B.W.I.A. A considerable network of Caribbean services is operated and Viscounts have now been introduced on the following routes:— Trinidad - Barbados - Puerto Rico - Bermuda - New York; Trinidad - Venezuela - Jamaica - Nassau; and Miami - Nassau.
Head Office: Port of Spain, Trinidad.
Executives: Sir Errol Dos Santos, O.B.E., chairman; J. H. Rahr, general manager; L. G. S. Hyland, commercial manager; Capt. G. P. Wood, operations manager; H. Cadiz, chief maintenance engineer.
Fleet: five Viking, three DC-3, four Viscount; on order, four Viscount (1957).
Results for year ended December 31st, 1955: 73,800 passengers; 480 tons of freight and 150 tons of mail carried; 2,790,400 ton-miles flown; total costs, £1,213,416; total revenue, £1,173,687; 710 staff at August 31st.

Butler Air Transport, Ltd., was founded in 1934 to operate a Charleville - Cootamundra service connecting with the Imperial Airways-Qantas England-Australia route. The airline was registered as a public company in 1952 and a large proportion of the stock is owned by company staff. In 1947 acquired the controlling interest in Queensland Airlines. Butler Air Transport operates about 9,000 miles of routes from Sydney to towns in New South Wales, with some short penetrations into Queensland.
Head Office: Sydney, N.S.W., Australia.
Executives: C. A. Butler, chairman/managing director; T. Williams, general manager; T. R. Young, operations manager.
Fleet: one Viscount, two Heron, five DC-3; on order one Viscount (July 1956), plus option on four Viscount.
Results for year ended December 31st, 1955: 158,442 passengers; 2.684 tons of freight and 10 tons of mail carried; total costs, £732,672; total revenue, £769,880; 308 staff. Financial details for year ended June 30th.

BWIA—see British West Indian Airways.

Byerly Airlines operates a daily service from Jacksonville, Illinois, to Peoria where it connects with T.W.A. flights to and from Chicago.
Head Office: Peoria, Ill., U.S.A.
Fleet: Lockheed Electra, Beech Bonanza.

California Central Airlines was founded in 1947 as an intrastate carrier, began scheduled services in 1949 and now operates services linking San Diego, the Los Angeles airports, San Francisco and Oakland. At one period the company was operating some Martin 2-0-2s but it is believed that, following financial difficulties and disputes with the C.A.B., these aircraft were disposed of.
Head Office: Burbank, Cal., U.S.A.
Executives: Col. C. C. Sherman, president/director of operations. E. K. Sherman, secretary/treasurer.
Fleet: DC-3.
Traffic statistics not available.

Canadian Pacific Air Lines, Ltd., was founded in 1942 by the Canadian Pacific Railway to acquire ten of the "bush" airlines, best known of which was Canadian Airways. C.P.A. operated a network of services in west and northwest Canada; a smaller network in the Winnipeg area; and a third system in Quebec and Labrador. These were a part of the overall C.P.R. system including railways and ships. In 1949 the company opened two trans-Pacific routes, the first *via* Honolulu, Canton and Fiji to Sydney, and the second *via* Anchorage, Shemya and Tokyo to Hong Kong. In 1955 a trans-Polar route was opened between Vancouver and Amsterdam. The eastern Canada services have now been taken over by T.C.A. and C.P.A. has added Toronto - Mexico and Vancouver - Mexico - Lima routes to its system.
Head Office: Montreal, Q.P., Canada.
Executives: W. A. Mather, chairman; G. W. G. McConachie, president (portrait, p. 484); T. F. Turner, secretary; H. B. Porteous, treasurer; R. B. Phillips, general manager operations; H. B. Renwick, general traffic manager.
Fleet: six DC-6B, one DC-4, five Convair 240, eight Curtiss C-46F, 15 DC-3, one Canso, two Otter, two Norseman; on order six DC-6B (1956-57); four Britannia 314 (autumn 1957).
Results for year ended December 31st, 1955: 269,509 passengers; 5,391 tons of freight and 1,528 tons of mail carried; 22,217,825 ton-miles flown; total costs, £7,223,237; total revenue, £7,335,216; 1,676 staff.

Capital Airlines, Inc., can trace its history back to April 1927 when Skyline Transportation Company began flying mail between Pittsburgh and Cleveland. The following year Skyline was taken over by Pennsylvania Airlines and passenger services were begun. In 1936 Pennsylvania Airlines and Central Airlines (then flying Detroit-Washington mail services) merged to form Pennsylvania-Central Airlines. The present name was adopted in 1948. Capital was a pioneer of air coach services and also the first U.S. airline to introduce turbine-powered aircraft, having placed orders for 60 Viscounts. Capital has a large route network in the eastern, north eastern and southern states. Viscounts are already serving several routes.
Head Office: Washington, D.C., U.S.A.
Executives: J. H. Carmichael, president (portrait, p. 484); R. G. Lochiel, vice-pres./treas.; J. B. Franklin, vice-president operations; J. W. Austin, vice-president traffic and sales.
Fleet: 60 Viscount in course of delivery, 12 Lockheed L-049, 20 DC-4, 20 DC-3.
Results for year ended December 31st, 1954: 2,386,000 passengers; 10,275,000 freight and mail ton-miles flown; total ton-miles 84,000,000; 4,600 staff.
Financial details not available.

A Convair-Liner CV-340 of Alitalia, showing main entrance.

WORLD AIRLINE DIRECTORY . . .

Caribbean Atlantic Airlines, Inc.—Caribair was founded in 1939, and in June that year took over the operations of its predecessor, Powelson Air Service, which had started scheduled services late in 1938. The company now operates services within Puerto Rico and to the Dominican Republic and the Virgin Islands.
Head Office: San Juan, Puerto Rico.
Executives: D. Trigo, president; J. Sierra, vice-president operations; R. B. Forrest, vice-president traffic.
Fleet: three DC-3.
Results for year ended December 31st, 1954: 120,000 passengers; 36,000 freight and mail ton-miles flown; total ton-miles, 944,000; other details not available.

Caspar Air Charters and Agencies, Ltd., is a charter operator but for several years has been operating scheduled services around Lake Victoria in association with East African Airways. Scheduled Lake circuits starting and ending at Entebbe are flown twice weekly in each direction. These serve Jinja, Tororo, Kisumu, Macalder, Musoma, Kiabakari, Mwanza, Geita and Bukoba. In addition there is a weekly Entebbe - Bukoba - Mwanza service. D.H.89s are used on these flights. The company recently absorbed Noon and Pearce Air Charter of Nairobi, thereby considerably increasing its fleet.
Head Office: Nairobi, Kenya.
Executives: E. B. Fielden, managing director; J. E. F. Wilkins, F. P. Nelson Gracie, D. Lead, directors.
Fleet: five D.H.89, two Anson 1, one Gemini, one Messenger, two Bonanza, one Leopard Moth, one Tiger Moth, two Autocrat, one Cessna 180, one Piper PA-18, one Chrislea Super Ace.
Traffic statistics not available.

C.A.T.—see Civil Air Transport.

Catalina Airlines. Little is known about this airline except that it operates services from Los Angeles International Airport and Los Angeles Burbank to Catalina Island with a total frequency of six daily flights in each direction. In 1931 Catalina Island began to receive air transport when Wilmington Catalina Airline opened a service from Wilmington, Cal. Two Douglas Dolphin amphibians were used and 7,878 passengers were carried in the first year.
Head Office: Beverly Hills, Cal., U.S.A.
Fleet: two Dove.

Cathay Pacific Airways, Ltd., founded in 1946 and reorganized in 1948, when 80 per cent of the stock was acquired by Butterfield and Swire and associated shipping companies, and Australian National Airways. In 1951 a further re-organization gave the Butterfield and Swire group 60 per cent and A.N.A. 40 per cent. The Hong Kong government, in 1949, gave Cathay Pacific rights for the operation of all routes south of Hong Kong with Hong Kong Airways receiving rights for services north of there. Routes are operated to Bangkok, Calcutta, Labuan, Manila, Rangoon, Saigon and Singapore.
Head Office: Hong Kong.
Executives: J. A. Blackwood, chairman; W. C. G. Knowles, managing director; D. R. Y. Bluck, traffic manager; C. F. Moore, operations manager; K. W. Steele, flight superintendent; J. T. Gething, chief engineer.
Fleet: one DC-6, one DC-4, one DC-3.
Results for year ended December 31st, 1955: 30,849 passengers; 504.67 tons of freight and 94.3 tons of mail carried; 4,284,963 ton-miles flown; 142 staff. Financial details not available.

Causa—see Compania Aeronautica Uruguaya, S.A.

Central African Airways Corporation, formed in 1946 by the Governments of Northern and Southern Rhodesia and Nyasaland, C.A.A. is successor to the war-time Southern Rhodesia Air Services and the pre-war Rhodesia and Nyasaland Airways. Operating some 15,000 miles of routes, the corporation is now the airline of the Federation of Rhodesia and Nyasaland. In addition to domestic services and the *Zambezi* coach service to London C.A.A. operate services to the Union of South Africa, Kenya, Tanganyika and Portuguese East Africa.

The Languedoc "Beiteddine" used by Air Liban.

Head Office: Salisbury, Southern Rhodesia.
Executives: P. J. B. Wimbush, general manager; K. H. Greager, engineering manager; R. A. Bourlay, operations manager; R. P. Hartley, secretary/chief accountant; H. D. Gray, traffic manager.
Fleet: 10 Viking, five DC-3, six Beaver; on order, five Viscount 700D (April/May 1956).
Results for year ended December 31st, 1955: 151,507 passengers; 1,309 tons of freight and 611 tons of mail carried; 8,809,159 ton-miles flown; total costs (year ended March 31st, 1955), £2,040,777; total revenue (same period), £2,017,054; 1,132 staff.

Central Airlines, Inc., was founded as an intrastate operator in Oklahoma in 1944. The company's first inter-state operations were authorized in 1946 and operations, with Beech Bonanzas, were inaugurated in September 1949. DC-3 operations began in 1950 and all Bonanzas were withdrawn during the following year. At present the airline has a route mileage of about 1,000 in Oklahoma, Texas, Arkansas, Missouri and Kansas.
Head Office: Fort Worth, Texas, U.S.A.
Executives: K. H. Kahle, president; F. E. Howe, executive vice-president/treasurer; J. L. Blackwell, vice-president operations; A. S. Aldridge, general traffic and sales manager.
Fleet: nine DC-3.
Results for year ended December 31st, 1955: 94,282 passengers; 239 tons of freight and 291 tons of mail; 1,610,648 ton-miles flown; total costs, £1,089,007; total revenue, £1,124,394, 367 staff.

Central Northern Airways—see Trans-Air, Ltd.

Ceskoslovenské Aerolinie-CSA is the Czech State airline which was founded in 1946 as successor to the C.S.A. established in 1923 and which, until the war, operated in competition with C.L.S. The airline now operates domestic services and to Belgrade, Berlin, Bucharest, Budapest, Copenhagen, Helsinki, Moscow, Paris, Prague, Sofia, Stockholm, Vienna, Vilno and Warsaw.
Head Office: Prague, Czechoslovakia.
Executives: not available.
Fleet: DC-3, Il-12.
Traffic statistics not available.

Civil Air Transport was founded by Maj-Gen. Chennault, leader of the A. V. G. Flying Tigers, and Whiting Willauer on October 25th, 1946, as C.N.R.R.A. Air Transport for the carriage of famine relief supplies in China. From 1947 commercial loads were allowed on return flights. After a series of moves forced by the Communist advance through China C.A.T. moved to Formosa in 1950. The airline, in addition to charter work in various parts of the world, operates round-the-island passenger and cargo services and international flights to Japan, South Korea, Manila, Hong Kong and Bangkok.
Head Office: Taipei, Taiwan (Formosa).
Executives: H. L. Grundy, president/general manager; C. J. Rosbert, vice-president/asst. general manager.
Fleet: two DC-4, 23 Curtiss C-46, five DC-3, two PBY Catalina.
Results for year ended December 31st, 1955: 103,577 passengers; 17,232 tons of freight and 174 tons of mail carried; 4,866,013 ton-miles flown; 2,598 staff. Financial details not available.

Colonial Airlines, Inc., was founded in 1928 as Canadian Colonial Airlines to operate mail services between New York and Montreal. The company adopted its present title on May 1st, 1942. Colonial operates 2,700 miles of routes linking the U.S.A. with Montreal and Ottawa and also a route to Bermuda. Following a two-year controversy, the company is now to be merged with Eastern Air Lines.
Head Office: New York, U.S.A.
Executives: B. T. Dykes, president; J. E. Reinke, vice-president traffic and sales; L. O. Cameron, vice-president/secretary; N. D. MacDonald, treasurer.
Fleet: eight DC-3, five DC-4.
Results for year ended December 31st, 1955: 451,479 passengers; 1,368 tons of freight and 646 tons of mail carried; 13,292,797 ton-miles

One of Central African Airways' fleet of de Havilland Beavers.

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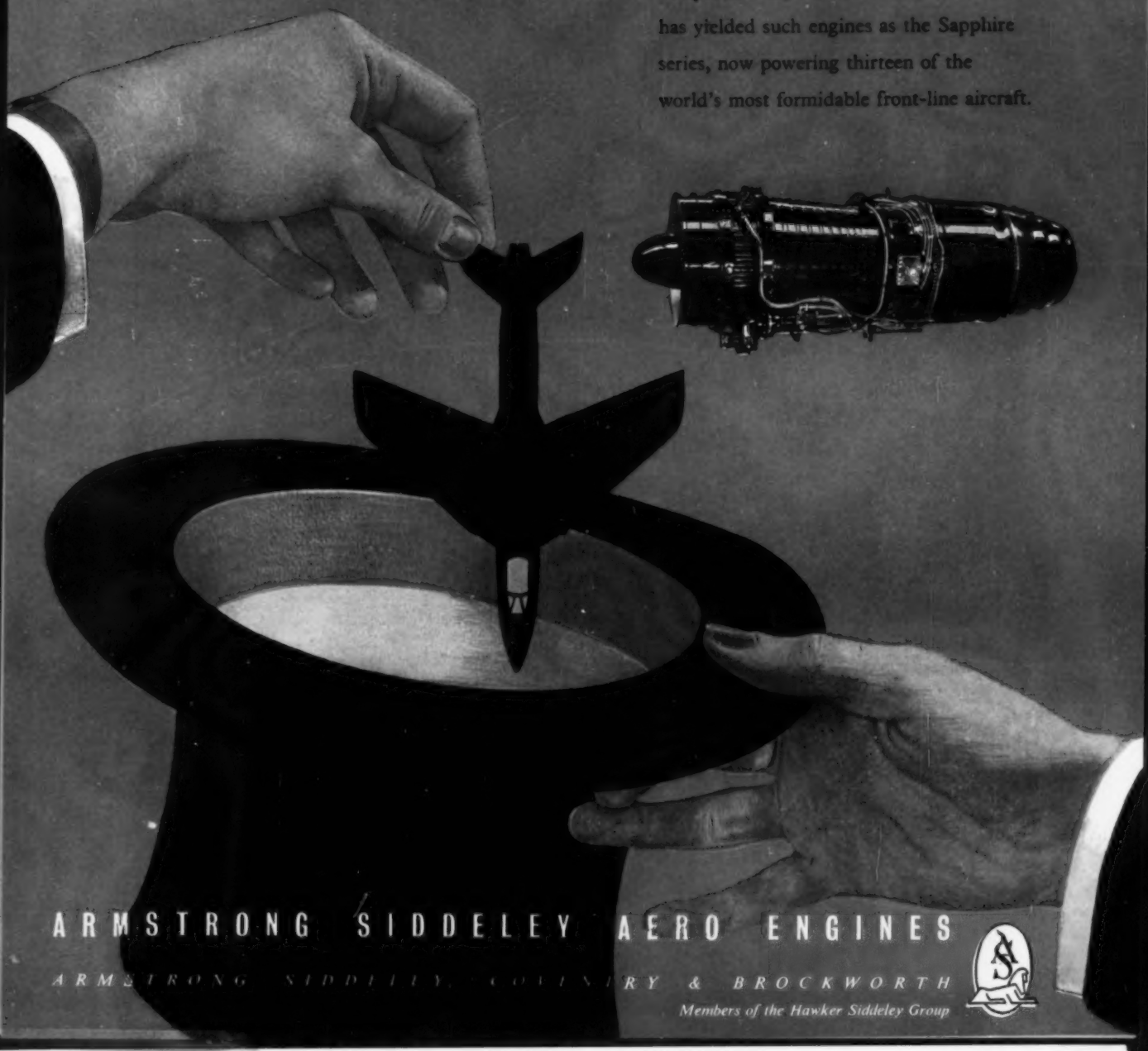

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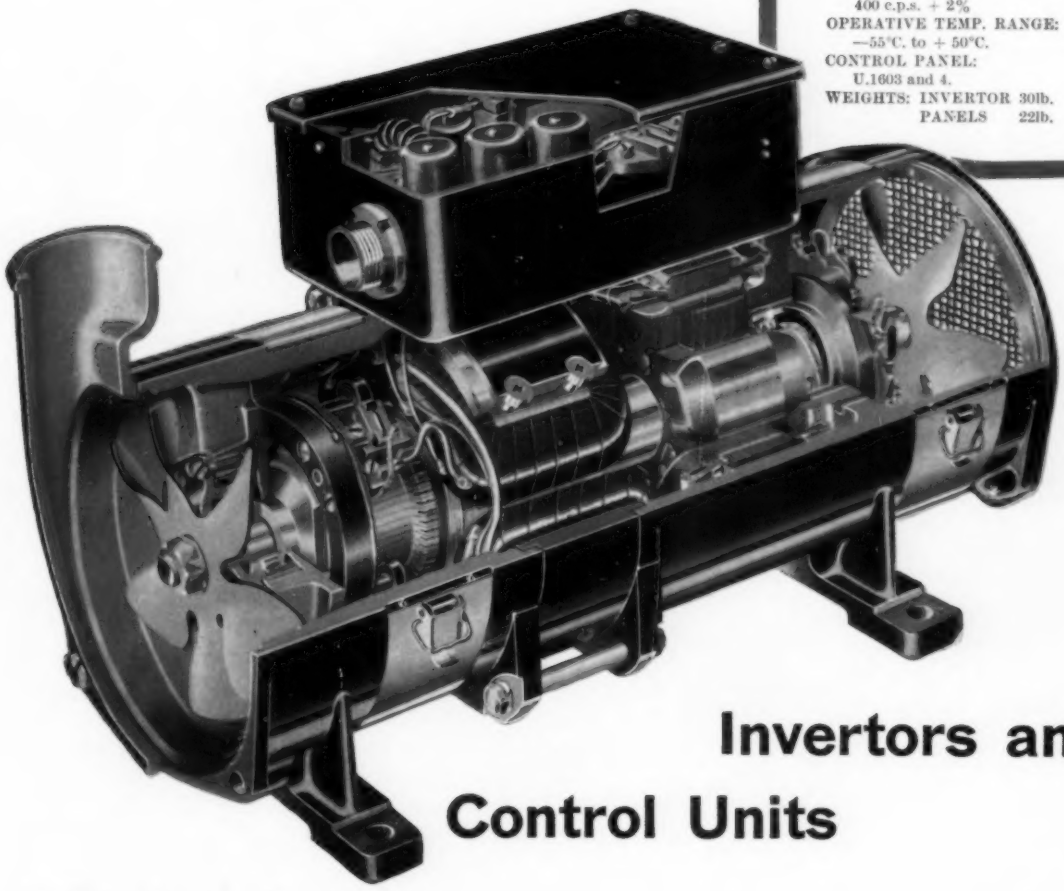

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WORLD AIRLINE DIRECTORY...

flown; total costs (preliminary) £3,419,835; total revenue (preliminary) £3,390,473; 799 staff.

Commercial Air Services (Pty.), Ltd., was founded in 1943 as a charter operator. Regular services were begun in 1948. At present C.A.S. flies twice a week between Bulawayo and Livingstone *via* Wankie; 10 times a week Johannesburg - Welkom; once on weekdays Welkom - Bloemfontein; and once on Saturdays Welkom - Durban. The scheduled services are flown by Lodestar and Cessna 170 aircraft.
Head Office: Johannesburg, Transvaal, Union of South Africa.
Executives: J. M. S. Martin, operations manager; L. Zimmerman, commercial manager.
Fleet: one Lodestar, one D.H.82, one Cessna 120, one Cessna 140, seven Cessna 170/170B, three Cessna 180.
Traffic statistics not available.

Compagnie de Transports Aériens Intercontinentaux — T.A.I. was formed after World War II as a charter operator, closely associated with shipping companies, and later established regular scheduled services to various parts of Africa, Madagascar and Saigon. A redistribution of French air routes became effective on January 1st this year and T.A.I. has been allotted 60 per cent of the traffic between France and North Africa and the eastern part of French West Africa; 50 per cent to Djibouti, Madagascar and Reunion; and 10 per cent between France and Morocco.

The company has also been made responsible for the development of French services to Indonesia, Ceylon, Australia and New Caledonia. The Air France services to Australia and New Caledonia have already been taken over by T.A.I.
Head Office: Paris, France.
Executives: P. Bernard, president; General G. Fayet, director-general; M. Mathieu, secretary - general; M. Gaffie, commercial director.
Fleet: four DC-6B, two DC-4; on order two DC-7C (December 1957).
Results for year ended December 31st, 1955: 51,161 passengers; 1,650 tons of freight and 292 tons of mail carried; 35,554,569 ton-km flown; 700 staff. Financial details not available.

Compagnie Générale de Transports Aériens Air Algérie was formed in 1953 by the merging of the original Air Algérie and Cie. Air Transport. The controlling interest in C.G.T.A. Air Algérie is held by Cie. Gle. Transatlantique in association with Cie. de Navigation Mixte. Services are operated within Algeria and from Algeria to Palma, numerous places in France and to Geneva.
Head Office: Algiers, Algeria.
Executives: J. Lignel, president; L. Adida, general manager.
Fleet: three DC-4, two DC-3, two SO 30P Bretagne. It is reported that some schedules are operated with Constellations, these may be leased from Air France.
Results for year ended December 31st, 1954: 105,925 passengers; 1,830,000 freight ton-km flown; total ton-km 11,443,000; 420 staff. Other details not available.

Compagnie Nationale AIR FRANCE is believed to have the greatest unduplicated route mileage of any airline. The company was formed in August 1933 by the merging of Air Union, S.G.T.A., and C.I.D.N.A. and the purchase of Aéropostale. Some of the Air France constituents can claim operating experience back to 1919. French air transport has a great history and was early in establishing European air services and services to Africa. The pioneering by French airlines of mail services in South America and later across the South Atlantic is one of the great stories of aviation. In addition to these routes a system of Mediterranean services was established and the route to Indo-China was opened as early as 1932. Air France now has about 170,000 miles of routes in Europe and Africa and to North and South America, the Near, Middle and Far East. Operations range from *de luxe* services to America and the Far East (with Super Constellations) to what might be termed desert bus services. The company also operates the French internal night mail services, which have achieved a very high standard of regularity and reliability frequently in extremely bad weather when all other flying has ceased.
Head Office: Paris, France.
Executives: M. Hymans, chairman; L. Lesieux, president.
Fleet: eight L-1049G, nine L-1049C, 18 L-749A, 12 Viscount, 12 Provence, 19 DC-4, 38 DC-3; on order six L-1049 (1956-57), 10 L-1649A (1957-58), 12 Caravelle (1958-60), 10 Boeing 707-328 (1959-60).
Results for year ended December 31st, 1955: 1,837,272 passengers; 47,689 tons of freight and 12,103 tons of mail carried; 296,072,075 ton-km flown. Other details not available.

Max Hymans, chairman, Air France.

A Fokker-built Saab Scandia seen on completion for the Brazilian airline VASP.

Compania Aeronautica Uruguaya, S.A.—Causa, was founded in 1936 and in 1938 opened a route between Montevideo and Buenos Aires, using Junkers—Ju52/3m floatplanes. In 1943 Causa opened a second route across Rio de la Plata, from Colonia to Buenos Aires. Sandringham flying-boats are used on both routes. The Montevideo - Buenos Aires route is flown in pool with Aerolineas Argentinas, with the Uruguayan company flying nine services a week. The Colonia route is flown once each way on weekdays.
Head Office: Montevideo, Uruguay.
Executives: J. A. Beisso, president; T. L. Borges, managing director; O. M. Rodriquez, secretary.
Fleet: Short Sandringham.
Traffic statistics not available.

Compañia Cubana de Aviacion, S.A.—Cubana, was founded in 1929 as Compañia Nacional Cubana de Aviacion Curtiss, S.A., for the operation of a school and charter services. Scheduled services were begun in 1930. Pan American obtained 100 per cent control of the company in 1932. P.A.A.'s holding was subsequently much reduced until in 1953 it was only 20 per cent, and it has now withdrawn from Cubana. The company now flies domestic services and also routes to Mexico, Haiti, Bermuda, Portugal and Spain. In order to meet the fierce competition in the area Cubana has ordered the three Viscounts which were under construction for Airwork.
Head Office: Havana, Cuba.
Executives: J. L. Vilaboy, president; J. M. Palli Díaz, vice-president/general manager; I. Calderin, treasurer.
Fleet: three L-1049, two Constellation, seven DC-3, five C-46; on order three Viscount 755.
Results for year ended December 31st, 1954: 229,419 passengers; 1,145,000 freight ton-km and 137,000 mail ton-km flown; total ton-km 13,403,000; 688 staff.
Financial details not available.

Compañía de Aviación "Faucett" S.A., is one of the oldest South American airlines, having been founded in 1928. The company now flies over 4,000 miles of internal routes and it is one of the few airlines which operates aircraft of its own manufacture: about 30 Faucett-built Stinsons were produced, and four of these are still used by the airline. The company's honorary president was the original founder.
Head Office: Lima, Peru.
Executives: E. J. Faucett, hon. president; E. Dibos, president of the board; A. Bentin, managing director.
Fleet: three DC-4, seven DC-3, four Stinson-Faucett.
Results for year ended December 31st, 1955: 136,456 passengers; 13,372 tons of freight and 466 tons of mail carried; 307 staff. Other figures not available.

Compañia Dominicana de Aviacion, S.A., was founded in 1944 by local interests and Pan American Airways. Scheduled domestic operations began that year. The company has a domestic route network and also flies from Ciudad Trujillo to Port au Prince in Haiti and to Miami, Florida.
Head Office: Ciudad Trujillo, Dominican Republic.
Executives: C. A. McLaughlin, president/general manager; G. M. Burrie, vice-president.
Fleet: DC-3, C-46.
In 1953 the company carried 19,200 passengers, 1½ tons of mail and 3 tons of freight.

Compañia Mercantil Anónima IBERIA, Lineas Aéreas Españolas, was established in 1940 as successor to L.A.P.E. Originally the Spanish Government owned 51 per cent of the capital with other Spanish interests and Deutsche Lufthansa holding the other 49 per cent. All stock was subsequently acquired by the Government. Iberia began as a domestic operator but now has in addition to its internal services others to London, Paris, Frankfurt, Geneva, Rome and Lisbon. Long distance services are operated to New York, Mexico, Venezuela, Buenos Aires and Spanish possessions in Africa and off the coast of that continent.
Head Office: Madrid, Spain.
Executives: D. Tomás Delgado, chairman (portrait, p.482); D. C. G. Lucia dir./gen. mgr.; F. Iglesias, chief engineer; J. M. Ansaldo, chief flight operations; J. Viniegra, general secretary.
Fleet: three L-1049, six DC-4, 17 DC-3, four Bristol 170; on order two L-1049G (August 1957), five Convair 440 (1957).
Results to year ended December 31st, 1955:

The East German Deutsche Lufthansa's Il-14, seen leaving Berlin on a special flight to Moscow.

WORLD AIRLINE DIRECTORY . . .

588,733 passengers; 2,311 staff. Other details not available but total ton-km flown in 1954 were 30,106,000.

Compañia Mexicana de Aviacion, S.A., was founded on August 20th, 1924, to carry payroll gold from Tampico to the oil fields in the State of Veracruz, thus avoiding the bandits who had been attacking the paymasters travelling by surface. The original fleet consisted of single-engined Lincoln Standard biplanes. In 1929 Pan American Airways acquired 100 per cent of C.M.A.'s stock but this holding was subsequently considerably reduced. C.M.A., now the main Mexican airline, operates a network of services within Mexico and to Los Angeles and Havana. Scheduled freight services are also operated within Mexico and to Los Angeles.
Head Office: Mexico, D.F.
Executives: A. Saenz, president; P. A. Chapa, vice-president; C. F. Osuna, vice-president; R. I. Perez, treasurer; A. Flores, secretary; E. R. Silliman, general manager; R. P. Pignot, operations manager; F. O. Willy, traffic manager.
Fleet: four DC-6, six DC-4, 19 DC-3, three Fairchild C-82A; on order four DC-7C (1957).
Results for year ended December 31st, 1955: 467,316 passengers; 15,530 tons of freight and 754 tons of mail carried; 54,117,085 ton-km flown; total costs, £4,567,292; total revenue, £5,183,030; 2,922 staff.

Compania Panamena de Aviacion, S.A.—COPA., an affiliate of Pan American World Airways, was founded in 1944 by P.A.W.A. and Panamanian interests, with the U.S. line holding 40 per cent of the stock. This holding has since been reduced. Scheduled services were begun in 1948. The company now operates a system serving seven points in Panama and San Jose in Costa Rica.
Head Office: Panama City, Panama.
Executives: R. Arias, president; R. Huertematte, secretary; F. Icaza, treasurer.
Fleet: DC-3.
Traffic statistics not available.

Connellan Airways, Ltd., became a limited company in 1951 but operations were begun in August 1939 when E. J. Connellan started flying a fortnightly 1,184-mile route serving nearly a score of places between Wyndham and Alice Springs; he used a Percival Gull. Now the company operates extensive local services based on Alice Springs and the unduplicated route mileage is about 8,000.
Head Office: Alice Springs, N.T., Australia.
Executives: E. J. Connellan, governing director; I. M. Leslie, secretary.
Fleet: three D.H.89, one D.H.90, one D.H.82, one Aiglet. [*Cont. in col.* 2.]

Results for year ended December 31st, 1954: 1,300 passengers; 90 tons of freight and mail carried; 27 staff.

Continental Air Lines, Inc., counts its history as dating from July 15th, 1934, when Varney Speed Lines began a service between El Paso and Pueblo with Lockheed Vegas. In December that year the Southwest Division of Varney Speed Lines became Varney Air Transport and on July 1st, 1937, the company became Continental Air Lines. Earlier in 1937 the Denver - Pueblo route of Wyoming Air Service (Inland Air Lines) was purchased. The company's latest acquisition, in 1954, was Pioneer Air Lines, which began service in 1945. Pioneer's routes measured 2,000 miles and served 22 cities in Texas and New Mexico. Continental now serves a population of 19 million people in the area bounded by Kansas City and Denver in the north and El Paso and Houston in the south. Throughplane agreements give access to Seattle, California, and St. Louis.
Head Office: Denver, Colorado, U.S.A.
Executives: L. H. Mueller, chairman; R. F. Six, president (portrait p.482); C. C. West, jnr., exec. vice-pres.; O. R. Haueter, vice-president operations; C. H. Calhoun, vice-president, engineering and maintenance; J. A. Uhl, vice-president/treasurer; S. B. Redmond, secretary.
Fleet: eight DC-3, six Convair 340, three DC-6B; leased aircraft, 12 DC-3, two DC-6B; on order three Convair 440 (1956), five DC-7B (1957), 15 Viscount 810D (1958), four Boeing 707 (1959).
Results for year ended December 31st, 1955: 600,792 passengers; 1,290,998 tons of freight and 754,951 tons of mail carried; 23,531,152 ton-miles flown; total costs, £5,406,262; total revenue, £5,743,870; 1,375 staff.

COPA—see Compania Panamena de Aviacion, S.A.

Cordova Airlines, Inc., began operations in 1934 and now operates services in the Anchorage - Cordova - Seward area and as far north as Fairbanks.
Head Office: Anchorage, Alaska.
Executives: M. K. Smith, president; J. M. Stern, traffic and sales manager.
Fleet: two DC-3, one Lockheed 10A, three Cessna 170, two Piper PA14, one Stinson V-77, one Stinson Junior, one Stinson Reliant.
In 1953 the company carried nearly 10,000 passengers and flew a total of 168,000 revenue ton-miles.

Corps d'Aviation de l'Armée d'Haiti. This military transport organization was founded in 1942, began mail carriage in the following year and passenger services in 1944. The route network, entirely within Haiti, measures 734 miles and consists of three triangular routes starting and ending at Port au Prince and a single route between Port au Prince and Jacmel.
Head Office: Port au Prince, Haiti.
Executives: Lt. Col. E. Roy, manager; Capt. A. Maignan, traffic manager; Lt. G. Danach, operations manager.
Fleet: three DC-3, one Stratoliner, one Beech AT-11.
Traffic statistics not available.

Cruzeiro—see Serviços Aéreos Cruzeiro do Sul, Ltda.

Cubana—see Compañia Cubana de Aviacion, S.A.

Cyprus Airways, Ltd., was founded in 1947 by B.E.A., the Cyprus Government and private interests. The British airline holdings are now 23 per cent each by B.E.A. and B.O.A.C. The company operates DC-3s on routes to Athens, Cairo, Beirut, Kuwait, Bahrein, Doha, Haifa, Istanbul, Port Sudan, Khartoum and Tel Aviv. In addition, B.E.A. provides Viscounts under a hire agreement for certain services between Nicosia and Beirut and Nicosia and Athens. These form part of the joint operation of the B.E.A./Cyprus Airways London - Athens - Nicosia/Beirut route.
Head Office: Nicosia, Cyprus.
Executives: Dr. C. Raeburn, chairman; J. A. Vick, general manager; B. G. Cooper, secretary; M. J. C. Auster, commercial manager; J. G. Williams, chief engineer.
Fleet: six DC-3.
Results for year ended December 31st, 1955: 39,604 passengers; 571.5 tons of freight and 339 tons of mail carried; 2,145,114 ton-miles flown; 277 staff. Financial details not available.

Ethiopian Air Lines' two Convair-Liner CV-240s at Addis Ababa.

Delta Air Lines, Inc. re-entered the airline business in 1934 after a break of four years following its pioneering of services in 1929 between Birmingham and Dallas. In 1953 the company took over Chicago and Southern Air Lines (founded in 1934) and until recently the company worked as Delta-C & S Air Lines. Delta has an extensive network stretching from New York, Detroit and Chicago in the north to Houston, New Orleans, Miami, Havana, San Juan and Caracas in the south. Westwards the network goes to Kansas City, Dallas and Fort Worth, while throughplane agreements provide service to Los Angeles, San Diego and San Francisco. Delta's services to New York have been made possible by new C.A.B. route awards.
Head Office: Atlanta, Ga., U.S.A.
Executives: C. E. Woolman, president/gen. mgr. (portrait, p.482); L. C. Parker, vice-pres. traffic and sales; C. H. Dolson, vice-president operations; T. G. Cole, vice-president finance.
Fleet: 11 DC-7, 20 Convair 340, seven DC-6, 16 DC-3; on order five CV-440 (1956), 10 DC-7 (1957), six DC-8.
Results for year ended December 31st, 1955: 2,144,316 passengers; 12,378 tons of freight and 5,003 tons of mail carried; 7,365,158 freight ton-miles flown; total costs, £19,730,926; total revenue £22,259,556; 4,547 staff.

D.E.T.A.—see Divisao de Exploraçao des Transportes Aéreos.

Deutsche Lufthansa. This is a new company, not to be confused with the West German airline, which was set up in 1955 under an agreement between the East German Democratic Republic and the U.S.S.R. The company receives technical assistance from the U.S.S.R. and when it opened its first service between Berlin and Warsaw earlier this year an Aeroflot Il-12 was used.
Head Office: Berlin, German Democratic Republic.
Fleet: Il-14.

Deutsche Lufthansa, A.G. describes itself as "a new airline with an old tradition." This is apt, as although the new airline began internal operations on April 1st, 1955, services to London on May 16th and to New York on June 8th that year, the original D.L.H. was founded in January 1926 and its winged crest originated with Deutsche Luftreederei in 1919.

Hans M. Bongers, managing director, Deutsche Lufthansa A.G.

The new Lufthansa operates a small internal network, European services to London, Paris, Madrid and Lisbon and North Atlantic services to New York *via* Shannon. This month services will be introduced to Montreal and Chicago via Manchester and future plans call for routes to Turkey, Lebanon, Iraq, Persia and South America.
B.E.A. is assisting with the operation of the Convairs and T.W.A., Lockheed and Transocean Air Lines with the Super Constellation flights.
Head Office: Cologne, Germany.
Executives: H. M. Bongers, managing director; G. Höltje, technical director.
Fleet: five L-1049G, four Convair 340, two DC-3, two Saab Safir (training); on order three L-1049G (1956), seven Viscount 810, four L-1649A, four Boeing 707.
Results for year ended December 31st, 1955: 73,215 passengers; 550 tons of freight and 366 tons of mail carried; 7,493,795 ton-miles flown; 2,000 staff. Financial details not available.

Divisao de Exploraçao des Transportes Aéreos—D.E.T.A. was organized in 1936 by the Colonial Government of Moçambique as a division of the Department of Railways, Harbours and Airways. Domestic services are operated and there are routes to Durban, Johannesburg and Salisbury.
Head Office: Lourenço Marques, Moçambique.
Executives: A. P. Pereira Leite, director general; A. H. Pinho da Cunha, manager; M. A. Cardoso Barata, acting manager.
Fleet: three DC-3, three Lodestar, six Dove, two Ju 52/3m, four D.H.89, one D.H.90, two D.H.87.
Results for year ended December 31st, 1955: 20,066 passengers; 475 tons of freight and 93 tons of mail carried; 1,474,000 ton-km flown; 721 staff.

Divisao dos Transportes Aéreos—DTA was founded in 1938 as a division of the Ports, Railways and Transport Administration. Operations began in 1938 and at present DTA operates a network of domestic services and also a route between Luanda and Leopoldville. During 1951 the Leopoldville route was extended to Lourenço Marques but was abandoned as a result of poor load factors.
Head Office: Luanda, Angola.
Executives: R. Serrão, president; J. de S. Medina, managing director.
Fleet: five DC-3, four Beech 18, seven D.H.89.
Results for year ended December 31st, 1954: 24,981 passengers; 188,000 freight ton-km and 51,000 mail ton-km flown; total ton-km, 1,441,000; 327 staff. Financial details not available.

East African Airways Corporation came into being in 1946; it is responsible for the development of air transport in the three territories of Kenya, Uganda and Tanganyika and each Territory is represented on the board, as is B.O.A.C. The corporation is successor to the pre-war Wilson Airways. E.A.A.C. operates a network of services in the three Territories and to South Africa, with a route mileage of more than 20,000. Freight services, begun in 1954, have already expanded.
The corporation may take over some B.O.A.C. Argonauts for use on its main services and may also use these on a new route to London.
Head Office: Nairobi, Kenya.
Executives: A. V. Gill, secretary; Capt. E. E. Morris, operations manager; A. E. Robinson, engineering manager; P. A. Travers, sales manager; A. G. Molison, manager stations and traffic.
Fleet: nine DC-3s, four D.H.89, one Consul (training); on order, four-engined aircraft (late 1956).
Results for year ended December 31st, 1955: 98,698 passengers; 2,591 tons of freight and 357 tons of mail carried; 5,962,473 ton-miles offered; total costs (estimated), £1,085,000; total revenue (estimated), £1,080,000; 1,229 staff.

Eastern Air Lines, Inc., is one of the largest U.S. carriers and its history goes back to 1927 when Pitcairn Aviation successfully bid for a mail contract between New York and Atlanta. The carrier's name became Eastern Air Transport in 1930, following North American Aviation's acquisition of Pitcairn in the previous year. New York Airways and Ludington Air Lines were acquired in 1931 and 1933 respectively. North American sold its holdings in 1938.
E.A.L. now has an extensive route system throughout the Eastern States serving Boston, Detroit and Chicago at the northern extremities; St. Louis, Memphis and San Antonio in the west; and Mexico City and Puerto Rico at the southwest and southeast corners of the network. Throughplane service with Braniff reaches to Rio de Janeiro and Buenos Aires *via* the west coast of South America. Other throughplane services extend to Minneapolis/St. Paul, Kansas City and Denver. Eastern is

E. V. Rickenbacker, chairman, Eastern Air Lines.

likely, after a long fight, to acquire Colonial Airlines. With a present fleet of 120 aircraft has no fewer than 108 aircraft on order.
Head Office: New York, U.S.A.
Executives: E. V. Rickenbacker, chairman/general manager; T. F. Armstrong, president; P. H. Brattain, first vice-president; T. E. Creighton, treasurer; F. L. Farley, secretary.
Fleet: 60 Martin 4-0-4, 18 L-749, 13 L-1049A, 16 L-1049C, 12 DC-7B, one DC-4; on order 10 L-1049G (autumn 1956), 28 DC-7B (1956, 57, 58), 40 Electra (1958-59), 18 DC-8 (1959-60), 12 Convair 440.
Results for year ended December 31st, 1954: 5,783,980 passengers; 11,192 tons of freight, 10,566 tons of express and 14,280 tons of mail carried; 494,663,000 ton-km flown; total cost, £58,128,983; total revenue £60,683,273; 10,794 staff.

East-West Airlines, Ltd., founded in 1947 to provide feeder services between inland districts and Brisbane and Sydney. Services between Tamworth and Sydney were opened in that year and to Brisbane in 1948. The airline now serves seven inland points on this route and also operates services from Sydney to Cowra, Cootamundra and West Wyalong.
Head Office: Tamworth, N.S.W., Australia.
Executives: D. M. Shand, chairman; Capt. A. J. Smith, general manager; R. O. Cooksey,

One of CSA's fleet of Soviet-built Il-12s.

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administration manager; J. G. Riley, operations manager.
Fleet: three DC-3, two Hudson; on order one DC-3 (by June 1956).
Results for year ended December 31st, 1955: 54,715 passengers; 811 tons of freight and four tons of mail carried; 1,344,000 ton-miles flown; 101 staff. Financial details not available.

El Al Israel Airlines, Ltd., was incorporated in November 1948 and began services to European cities, including London, in 1949. Routes to the U.S.A. and the Union of South Africa were opened in 1951. The Government of Israel has the majority holding in El Al; the shipping company Zim Israel Navigation Co., Ltd., also has a financial interest in the airline.
Head Office: Tel Aviv-Yafo, Israel.
Executives: L. A. Pincus, managing director; Y. Palgi, deputy managing director (production and operations); Dr. A. Rywkind, deputy managing director (commercial).
Fleet: five L-049 Constellation, three Curtiss C-46, one Consul (training); on order, three Britannia 313 (early 1957).
Results for year ended December 31st, 1955: 35,000 passengers; 700 tons of freight and 130 tons of mail carried; 46,000,000 passenger miles flown; 1,088 staff. Financial details not available.

Ellis Air Lines was incorporated in 1940 but operations had been started as far back as 1936, when R. E. Ellis began flying with one Waco biplane. Routes are operated from Ketchikan to as far north as Sitka and Juneau. In 1952 a southward extension from Ketchikan to Prince Rupert gave Ellis Air Lines its first international operation.
Head Office: Ketchikan, Alaska.
Executives: R. E. Ellis, president; J. L. Sherman, vice-president maintenance; G. A. Bodding, vice-president operations.
Fleet: Goose.
Results for year ended December 31st, 1954: 52,500 passengers; 800 tons of freight and mail carried; 45,000 freight and mail ton-miles flown; 96 staff.
Financial details not available.

Empresa de Transportes Aerovias Brasil, S.A., was founded by TACA Airways in 1942. After the war Aerovias Brasil became one of the two Brazilian companies to operate international services to the U.S.A. TACA sold its interests in 1947 and in 1949 VASP acquired the controlling interest but this was later transferred to the Municipal Bank of Sao Paulo. The airline is now a subsidiary of REAL which gained control of the company in 1954. Although operated as a separate concern Aerovias Brasil's routes, staff and equipment are integrated with REAL and Aeronorte. The company is known as Brazilian International Airlines and this title, together with the Real Aerovias Brasil System, appears on timetables and publicity. B.I.A. operates domestic services and services from Buenos Aires and Montevideo through Brazil to Trinidad, Venezuela and Miami.
Head Office: Sao Paulo, Brazil.
Executives: not available.
Fleet: DC-4, DC-3; on order DC-6B.
Traffic statistics not available.

Empresa Guatemalteca de Aviacion—AVIATECA, was formed by the Guatemala Government in 1945 to take over Aerovias de Guatemala, which had been founded in 1939, and which began operating in 1940. The company operates about 1,400 miles of routes radiating from Guatemala City.
Head Office: Guatemala City, Guatemala.
Executives: Col. R. Mendoza, president; C. J. Hirst, operations manager.
Fleet: one DC-4, six DC-3, one Norseman.
In 1954 Aviateca carried about 64,000 passengers and 3,500 tons of freight and mail.

Ethiopian Air Lines, Inc. is owned by the Ethiopian Government and managed by T.W.A. Services were begun in April 1946 and the present operations include services within Ethiopia and to Aden, Nairobi, Khartoum, Cairo and Athens. E.A.L. was for a time one of the few airlines using rocket-assisted take-off for passenger aircraft, a practice now discontinued.
Head Office: Addis Ababa, Ethiopia.

One of Flugfélag Islands' PBY-5A Canso amphibians.

Executives: H. E. Lij Araya Abebe, president and chairman; H. E. Ato Menasse Lemma, vice-president; V. H. Harrell, Jnr., general manager; M. F. Garrison, secretary/treasurer; H. F. Noon, acting general operations manager; D. P. Reid, general sales manager.
Fleet: two Convair 240, eight DC-3; on order, one Convair 240 (June 1956).
Results for year ended December 31st, 1955: 67,023 passengers; 4,855 tons of freight and 65 tons of mail carried; 8,409,433 ton-miles flown; total costs (estimated) £1,258,650; total revenue (estimated) £1,386,250; 591 staff.

Far Eastern Airlines is a subsidiary of the manufacturing agents C. Itoh. At the end of 1953 the company was awarded the right to operate feeder services from Osaka. Present routes are from Osaka to Takamatu, Iwakuni, Fukuoka, Miyazaki, Kochi and Yonago.
Head Office: Osaka, Japan.
Executives: Admiral T. Nakamura, general manager, Capt. H. G. Holmes, operations manager.
Fleet: Dove, Marathon.
Traffic statistics not available.

Faucett—see Compañia de Aviacion-Faucett.

Federation Air Service began operation, in November 1951, of local services based on Kuala Lumpur. These link up numerous isolated areas and also act as feeder services to the routes of Malayan Airways, with which Federation Air Service is in association.
Head Office: Kuala Lumpur, Malaya.

Fleet: six Beaver.

Fiji Airways was founded in 1951 by Harold Gatty, who flew round the world in a Lockheed Vega with Wiley Post in 1931—they took just under nine days. Regular services within Fiji were begun in September 1951 using D.H.89s. Drover aircraft now link Suva, Nandi, Savusava, Taveuni and Lambasa.
Head Office: Nandi, Fiji.
Executives: H. Gatty, managing director; Capt. F. Ladd, chief pilot; L. Dobbin, chief engineer.
Fleet: one or two Drover, two D.H.89.
Traffic statistics not available.

Finnair—see Aero O/Y.

Flugfélag Islands h.f. (Iceland Airways, Ltd.), founded in 1937 as Flugfélag Akureyrar and began operation with one Waco biplane on floats. The present company name was adopted in 1940. In 1946 the company began services to Scandinavia and the United Kingdom. These were operated by Scottish Aviation for Iceland Airways until 1948 when the company introduced its own DC-4 aircraft. DC-3s and flying-boats serve a score of places in Iceland and DC-4s operate from Reykjavik to Copenhagen, Hamburg, Glasgow and London.
Head Office: Reykjavik, Iceland.
Executives: O. O. Johnson, general manager; J. R. Snorrason; chief pilot; B. Tomasson, chief engineer; S. K. Matthiasson, traffic manager (international); H. Sigurdsson, traffic manager (domestic); S. Thorbjornsson, chief accountant.
Fleet: two DC-4, four DC-3, two PBY-5A Canso, one Goose.
Results for year ended December 31st, 1955: 53,451 passengers; 1,118 tons of freight and 135 tons of mail carried; 3,164,395 ton-km flown; 180 staff. Financial details not available.

Flying Tiger Line Inc., The. Founded in June 1945 as National Skyway Freight Corporation. In addition to non-scheduled flying Flying Tiger Line operates coast-to-coast scheduled freight services. Every weekday a DC-6A flies from Los Angeles to New York *via* Chicago and Detroit returning nonstop; to the same frequency there is also a DC-6A flight from San Francisco to Chicago and Detroit. C-46s serve the following additional cities: Seattle, Portland, Minneapolis/St. Paul, Milwaukee, Cleveland, Buffalo, Binghamton, Philadelphia, Hartford and Boston. In 1954 an attempt to merge with Slick Airways had to be abandoned because of financial problems involved.
Head Office: Burbank, Cal., U.S.A.
Executives: R. W. Prescott, president; F. Benninger, secretary; W. E. Bartling, vice-president operations.
Fleet: six DC-4, seven DC-6A, 23 C-46; on order 10 L-1049H.
In 1954 Flying Tiger Line flew 25,000,000 revenue ton-miles.

Frontier Airlines, Inc., acquired in June 1950 the temporary certificates of Arizona Airways, Challenger Airlines and Monarch Airlines, and is now operating a network of 3,500 miles in Colorado, Arizona, New Mexico, Utah, Wyoming, Montana and North Dakota.
Head Office: Denver, Colorado, U.S.A.
Executives: L. E. Leverone, chairman; C. A. Myhre, president; E. N. Levin, secretary; L. P. Blatter, treasurer; J. D. Lindsay, vice-president traffic and sales.
Fleet: 13 DC-3.
Results for year ended December 31st, 1955: 172,282 passengers; 1,920 tons of freight and 375 tons of mail carried; 5,278,281 ton-miles flown; total costs (estimated), £1,953,000; total revenue (estimated), £1,969,000; 638 staff.

Garuda Indonesian Airways N.V. is the State-owned Indonesian airline, which had been formed by the Government and K.L.M. as successor to K.L.M.'s post-war operations in the area and the pre-war K.N.I.L.M. National-

A Jersey Airlines' de Havilland Heron Series 1 taking-off from Alderney.

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The prototype Rolls-Royce Dart powered Fokker F.27 Friendship. Aer Lingust is among the airlines which have placed orders.

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ization took place in 1954 when K.L.M.'s shares were bought up. Services are operated within and between the islands of the republic and to Singapore, Bangkok and Manila.
Head Office: Djakarta, Indonesia.
Executives: Dr. M. Soetoto, president; Dr. R. Sugoto, and D. K. van Houten, joint managing directors.
Fleet: 14 Heron, 12 DC-3, eight Convair 340, eight Convair 240.
Results for year ended December 31st, 1955: 405,000 passengers; 9,100 tons of freight and 2,400 tons of mail carried; 35,600,000 ton-miles flown; 3,600 staff. Financial details not available.

Gibbes Sepik Airways, Ltd., are operators of scheduled and non-scheduled services in New Guinea. Junkers Ju52/3ms have been purchased from Sweden and these will shortly replace or supplement the present Norseman fleet.
Head Office: Goroka, Territory of New Guinea.
Executives: R. H. Gibbes, managing director; M. J. C. Gibbes, director; V. W. Cox, general manager/secretary; E. Cross, chief engineer.
Fleet: four Norseman; two Ju52/3m; on order, one Ju52/3m (May 1956).
Results for year ended December 31st, 1955: 18,861 passengers; 2,378 tons of freight and 59 tons of mail carried; approx. 943,050 ton-miles flown; 121 staff. Financial details not available.

Gibraltar Airways, Ltd., formed in 1947 as a B.E.A. subsidiary with B.E.A. holding 51 per cent of the stock and M. H. Bland and Co., Ltd., holding the remainder. Operations between Gibraltar and Tangier and later to Spain and Spanish Morocco were maintained by D.H.89 aircraft. In October 1953 an agreement was concluded whereby B.E.A. undertakes all flying operations with a DC-3. Gibraltar Airways now operates only between Gibraltar and Tangier but the DC-3 also flies connecting services between Gibraltar and Madrid on certain days, thus providing higher frequency services to and from London.
Head Office: Gibraltar.
Executives: Sir George Gaggero, O.B.E., chairman; The Earl Amherst, M.C., deputy chairman.
Fleet: one DC-3 owned and operated by B.E.A.
Results for year ended December 31st, 1955: 17,483 passengers; 20 tons of freight and 21 tons of mail carried; 2,050 freight and mail ton-miles flown. Other details not available.

Guest Aerovias Mexico, S.A. was founded in 1946 and in 1948 the company opened a service to Madrid but this was later abandoned. The company's latest venture was the opening of a route linking Mexico and Windsor, Ontario. Constellations purchased from Qantas are used on this route, which is flown twice weekly, as well as on the service every weekday from Mexico to Miami. A DC-4 flies a once weekly service between Mexico and Panama. The company also hopes to operate into New York. The company trades as Guest Airways Mexico.
Head Office: Mexico City, Mexico.
Executives: W. Guest, president; G. L. Monteiro, director, traffic and sales.
Fleet: DC-4, L-749 Constellation.
Results for year ended December 31st, 1954: 19,103 passengers; 673,000 freight ton-km and 76,000 mail ton-km flown; total ton-km 4,736,000; 252 staff.
Financial details not available.

Guest Airways—see Guest Aerovias Mexico, S.A.

Guinea Airways, Ltd., now operate services in the Adelaide area of South Australia. Originally formed in 1927, the company did remarkable work in the New Guinea goldfields until this was ended by the Japanese. A route had also been established from Darwin to Adelaide. After the war the newly formed State-owned Trans-Australia Airlines drove Guinea Airways off this route and caused its decline to the status of a small operator.
Head Office: Adelaide, South Australia.
Executives: S. Powell, chairman; C. A. Window, secretary; Capt. N. S. D. Buckley, chief pilot.
Fleet: five DC-3, two Auster.
Results for year ended December 31st, 1955: 90,424 passengers; 1,329.7 tons of freight and 89.2 tons of mail carried; other details not available.

Gulf Aviation Co., Ltd., was formed in 1950 by Mr. F. Bosworth. The company became a subsidiary of B.O.A.C. in the following year. Five services are operated daily between Bahrein and Dhahran and there are also services from Bahrein to Doha, Abu Dhabi and Sharjah.
Head Office: Bahrein.
Executives: G. Beeby Thompson, chairman; G. F. W. Parker, general manager; K. H. N. Bulmer, chief pilot.
Fleet: believed to be four Dove, including two Dove hired from B.O.A.C.
More than 16,000 passengers were carried in 1953 and in the financial year 1954-55 the company's profit was £5,954.

Hawaiian Airlines, Ltd., was founded in January 1929 as Inter-Island Airways. The Inter-Island Steam Navigation Company held 76 per cent of the original stock, services were begun in November 1929 and Sikorsky amphibian biplanes were used. The present title was adopted in 1941 and it was in that year that DC-3s were first introduced. The airline's services link Hawaii, Maui, Lanai, Molokai, Kauai and Honolulu on Oahu.
Head Office: Honolulu, Hawaii.
Executives: S. C. Kennedy, president; D. Watson, vice-president-controller.
Fleet: six Convair 340, 10 DC-3.
In 1954 Hawaiian carried nearly 390,000 passengers and more than 10,000 tons of freight and mail.

Helicopter Air Service, Inc., has authorization to operate helicopters to any point within 50 miles of Midway Airport, Chicago, and has since 1949 been operating shuttle mail services between the roof of the main Chicago post office and Chicago Municipal Airport. This shuttle is operated at high frequency and, in addition, a number of mail flights are made on weekdays over three circuits, each of which serves a large area. Passenger services are contemplated when the company's S-55s are delivered later this year.
Head Office: Chicago, Ill., U.S.A.
Executives: J. S. Gleason, Jnr., president/treasurer; C. W. Moore, executive vice-president; J. C. Brogan, vice-president/secretary.
Fleet: six Bell 47G; on order, three S-55 (May, June, July 1956).
Results for year ended December 31st, 1955: 1,558 tons of mail carried; 28,458 ton-miles flown; total costs, £163,210; total revenue, £182,850; 47 staff.

Hong Kong Airways Ltd. was formed in 1947 by B.O.A.C. for the operation of services linking the Corporation's trunk routes with China. After the communist conquest of China, B.O.A.C. sold the company to Jardine Matheson and Co., Ltd., the present owners.
Hong Kong Airways now operates services between Hong Kong and Formosa with a chartered DC-4. Connecting services to Japan are operated by Northwest Airlines. H.K.A. will fly the entire route after receipt of its Viscounts now on order.
Head Office: Hong Kong.
Executives: H. D. M. Barton, chairman; B. Smallpiece, director; Hon. D. C. Geddes, director; M. A. Snowball, director.
Fleet: one DC-4 (chartered); on order, two Viscounts (December 1956, March 1957).
Results for year ended December 31st, 1955: 6,739 passengers; 260.32 tons of freight and 20.9 tons of mail carried; 524,929 ton-miles flown. Financial details and number of staff not available.

IBERIA—see Compañia Mercantil Anonima IBERIA.

Iceland Airways, Ltd.—see Flugfélag Islands h.f.

Icelandic Airlines Loftleidir, formed in 1944, has operated services within Iceland and between Iceland and other European destinations, but now confines its activities to the operation of North Atlantic services between New York and Scandinavia, Germany and Luxembourg *via* Iceland.
Fares are substantially below I.A.T.A. rates, although the sectors east of Iceland have I.A.T.A.-agreed fares. Braathens S.A.F.E. Airtransport of Norway works closely with the Icelandic company.
Head Office: Reykjavik, Iceland.
Executives: K. Gudlaugsson, chairman; A. Eliasson, general manager.
Fleet: three DC-4.
Results for year ended December 31st, 1955: 16,800 passengers; 174,282 tons of freight and 23,139 tons of mail carried; 7,709,907 ton-km flown; 125 staff. Financial details not available.

Indian Airlines Corporation was formed in 1953, taking over on August 1st that year the services previously operated by a number of private airlines. Operating 23,600 miles of routes in India and to Afghanistan, Burma, Ceylon, Nepal and East and West Pakistan, the Corporation's operations are divided into three areas with bases at Bombay, Calcutta and Delhi.
I.A.C. is responsible for all Indian internal services but Air-India International flies a few such services as part of its international network. Most of the A.I.I. revenue from internal sectors is passed to Indian Airlines.
Head Office: New Delhi, India.
Executives: S. Prasada, chairman; Y. N. Varma, secretary; B. Narayan, financial controller;

A Douglas DC-8 as it will appear in the livery of K.L.M.

Mackey Airlines' newly acquired DC-4 "City of Nassau."

WORLD AIRLINE DIRECTORY . . .

Capt. J. Chitambar, chief operations and training manager; J. M. Gupta, chief traffic manager.
Fleet: six DC-4, 12 Viking, 66 DC-3, eight Heron, eight small aircraft; on order, five Viscount (mid-1957).
Results for year ended March 31st, 1955: 477,583 passengers; 50,257 tons of freight and 4,659 tons of mail carried; 32,389,522 ton-miles flown; total costs, £6,033,762; total revenue, £5,272,538; 7,200 staff.

Iraqi Airways was founded in 1945 as a subsidiary of the Government-owned Iraqi State Railways. B.O.A.C. supplies certain technical staff as required. Services are operated from Baghdad to Aleppo, Bahrein, Basra, Beirut, Cairo, Damascus, Kuwait, Mosul and Teheran. Viscounts have now been introduced on some of these routes and they may be used to operate new services to London and to the east.
Head Office: Baghdad, Iraq.
Executives: S. K. Al Askari, manager; A. D. Bennett, technical adviser; T. W. Walters, flight captain.
Fleet: three Viscount, three Viking, one Dove; on order, one Viscount (Oct., 1957).
Results for year ended December 31st, 1955: 40,531 passengers; 223 tons of freight and 36 tons of mail carried; 6,554,938 ton-km flown; total costs, £428,576; total revenue £523,562; 246 staff.

Iranian Airways was founded as a private company in 1944 and began limited operations in the following year. The airline now flies an internal network based on Teheran and has international services to Afghanistan, Iraq, the Lebanon, Kuwait and Pakistan. Iranian Airways, in 1949, absorbed Eagle Airlines, which had been flying domestic services with Dove aircraft.
Head Office: Teheran, Iran.
Executives: R. Afshar, chairman and managing director; H. Afshar, assistant managing director; A. A. Barrie, technical director.
Fleet: five DC-3, two DC-4, two Dove, four D.H.89, one Beechcraft; on order, two DC-3 (1956).
Results for year ended December 31st, 1955: 49,141 passengers; 710 tons of freight and 72 tons of mail carried; 2,222,730 ton-miles flown; total costs, £510,428; total revenue, £528,571; 217 staff.

Japan Air Lines Co., Ltd. (Nihon Koku Kabushiki Kaisha), is successor to the Japan Air Lines which was founded by private interests in 1951. That company opened domestic services with Martin 2-0-2s and DC-4s which, together with crews, were leased from Northwest Airlines. In 1953 the new company came into being with the Government holding 50 per cent of the stock. The old J.A.L. routes were taken over and routes were also opened to Hong Kong, Okinawa, Honolulu and San Francisco.
Head Office: Tokyo, Japan.
Executives: S. Yanagita, president; S. Matsuo, managing director.
Fleet: three DC-6B, seven DC-4, four Heron; on order, four DC-8.
Results for year ended December 31st, 1954: 279,297 passengers; 1,613,000 freight ton-km and 1,358,000 mail ton-km flown; total ton-km 21,792,000; 1,040 staff.
Financial details not available.

Jugoslovenski Aerotransport—JAT was founded in 1946 and is now the sole Jugoslav airline; it is completely state-owned. Domestic services are operated as well as routes to Athens, Cairo, Frankfurt, Istanbul, London, Munich, Paris, Vienna and Zürich.
Head Office: Belgrade, Jugoslavia.
Executives: M. Simovic, general manager; M. Rakic, traffic director; R. Zivanovic, finance director; R. Radojkovic, technical director.
Fleet: 13 DC-3, two Convair 340; on order, one Convair 440 (February 1957).
Results for year ended December 31st, 1955: 102,365 passengers; 321 tons of freight and 234 tons of mail carried; 8,403,278 ton-km flown; 790 staff.
Financial details not available.

Karhumäki Airways is the airline operating offshoot of the long-established Finnish aircraft manufacturing, maintenance and charter organization. Scheduled operations were begun in 1950 between Helsinki and Joensuu, using two D.H.89s bought from Finnish Air Lines. In the following year further internal routes were operated as well as one to Sundsvall in Sweden and Lodestars were then used. The company's present routes are from Helsinki to Tampere; Helsinki to Joensuu; and between Tampere and Stockholm.
Head Office: Helsinki, Finland.
Executives: N. Karhumäki, president; U. Karhumäki, operations manager; M. Palmujoki, traffic manager; T. Karhumäki, chief engineer.
Fleet: three DC-3.
Results for year ended December 31st, 1955: not available.

K.L.M.—see Koninklijke Luchtvaart Maatschappij.

K.N.A.—see Korean National Airlines.

Koninklijke Luchtvaart Maatschappij N.V. (K.L.M.), the Dutch national airline, began operations in May 1920. A European network was established, and services to Java began in 1929. Services were begun in the West Indies in 1935 and these continued throughout the war, so the company can claim more than 35 years of continuous operation.
With a present unduplicated route mileage of about 140,000 miles, K.L.M. has a network of European routes, a West Indies network, and routes between Europe and North, Central and South America; South Africa; the Near, Middle and Far East; and Australia. For more than 30 years K.L.M. was directed by its founder, the late Dr. Albert Plesman. The majority of the company's capital is now held by the Netherlands Government.

I. A. Aler, president of K.L.M.

Head Office: The Hague, Holland.
Executives: I. A. Aler, president; F. von Balluseck, deputy president, traffic and sales; M. J. van der Ploeg, deputy president/controller-treasurer; J. van der Wiel, executive vice-president/secretary.
Fleet: 10 L-749, 13 L-1049, six DC-6, one DC-6A, seven DC-6B, six DC-4; 14 Convair 340, seven Convair 240, 15 DC-3, one D.H.89, one Auster; on order, three L-1049 (1956), 10 DC-7C (1957), nine Viscount 803 (1957), two Fokker Friendship (1958), eight DC-8 (1960), 12 Electra.
Results for year ended December 31st, 1955: 725,000 passengers, 22,456 tons of freight and 2,527 tons of mail carried; 14,800 staff. Other details not available.

Korean National Airlines was founded under the Ministry of Transport in 1947, and operated routes radiating from Seoul with Stinson Voyagers. DC-3s were introduced in 1950 shortly before the Korean war stopped commercial operations, which were resumed in 1952. The company now operates DC-3 services within South Korea and a DC-4 service between Seoul and Hong Kong. The company plans to open a Korea - U.S.A. route *via* Honolulu.
Head Office: Seoul, South Korea.
Executives: Y. W. Shinn, president; B. Locker, traffic and sales manager; J. H. Tyler, operations director; M. McCormick, chief engineer.
Fleet: DC-4 and three DC-3.
Traffic statistics not available.

Kuwait Airways, Ltd., was founded in 1953 as Kuwait National Airways, the present name having been adopted last year. Services are operated to Basra, Abadan, Damascus, Jerusalem and Beirut. The company is an associate of B.O.A.C. and although the aircraft is not shown on the company's fleet list it is reported that the Beirut service is operated with a Hermes.
Head Office: Kuwait.
Executives: A. S. Alkhalid, chairman; A. R. Mishri, manager; L. C. Giles, resident adviser.
Fleet: two DC-3.
Results for year ended December 31st, 1955: 15,809 passengers; 551 tons of freight and 8.5 tons of mail carried; 75 staff. Other figures not available.

LACSA—see Lineas Aereas Costarricenses, S.A.

LADE—see Lineas Aereas del Estado.

Lake Central Airlines, Inc., was founded in May 1949 as Turner Airlines to take over and operate the feeder services awarded to, but not implemented by, Roscoe Turner Aeronautical Corporation in 1947. Lake Central began services in November 1949 and works 1,500 miles of routes in the states between and to the south of Lakes Erie and Michigan.
Head Office: Indianapolis, Indiana, U.S.A.

Executives: Dr. R. B. Stewart, chairman; G. Hicks, president; L. W. Hartman, executive vice-president/treasurer; R. W. Clifford, vice-president-operations; D. S. Getchell, vice-president traffic and sales.
Fleet: eight DC-3.
Results for year ended December 31st, 1955: 115,950 passengers; 984 tons of express and 258 tons of mail carried; 1,700,969 ton-miles flown; total costs, £921,151; total revenue, £927,506; 311 staff.

LANICA—see Lineas Aereas de Nicaragua, S.A.

LAV—see Linea Aeropostale Venezolana.

Leavens Bros., Ltd., which operates passenger services between Leamington and Pelée Island in Lake Erie, a distance of 22 miles, was originally formed in 1927. It was incorporated as Leavens Bros. Air Services in 1935 and was reorganized under its present name in 1953.
Head Office: Toronto, Ontario, Canada.
Executives: C. R. Leavens, president and general manager; R. H. Leavens, vice-president; C. D. Leavens, secretary; R. O. Brown, treasurer.
Fleet: two Cessna Crane.
Results for year ended December 31st, 1955: 3,006 passengers; 36 tons of freight and 39 tons of mail carried; 1,812 ton-miles flown; total costs, £8,048; total revenue, £9,520; three staff. (Figures are for scheduled operations of Leamington branch.)

Liberian National Airways is a Government-owned airline which began operations in 1952. Internal services are operated from Robertsfield and Monrovia to seven other points.
Head Office: Robertsfield, Liberia.
Executives: F. H. Syphert, president.
Fleet: three DC-3, one D.H.89.

Libyan Airways Company.
Head Office: Tripoli, Libya.
Services suspended at present.

Linea Aerea Nacional—CHILE was founded in 1932 by the Chilean Government to take over Linea Aeropostal Santiago Arica. The original fleet consisted of three Ford Trimotors. The company has developed services throughout the length of Chile and international routes to Mendoza, Buenos Aires and Rio Grande in the Argentine; La Paz in Bolivia; Lima and Tacna in Peru and Montevideo in Uruguay.
Head Office: Santiago, Chile.
Executives: A. Fernández, president; E. Silva, secretary general; H. M. Sauvageot, business manager; A. Bermudez, technical manager.
Fleet: three DC-6B, three Martin 2-0-2, 16 DC-3, one Electra.
Results for year ended December 31st, 1955: 222,018 passengers; 2,324 tons of freight and 114 tons of mail carried; 16,825,065 ton-km flown; total costs, £3,003,428; total revenue, £1,920,985; 1,304 staff.

Linea Aerea TACA de Venezuela, C.A., Founded in 1944 by TACA Airways S.A. and Venezuelan interests. Local services were opened in 1945 and in 1950 TACA Airways disposed of its interest in the company. Two years later L.A.V. acquired outstanding stock and the airline is now a wholly owned L.A.V. subsidiary operated as a separate division. Services operated are all domestic with the exception of the routes from Caracas and Maracaibo to Bogota in Colombia.
Head Office: Caracas, Venezuela.
Executives: Col. L. Calderon, president; L. Paúl, general manager.
Fleet: 13 DC-3.
Results for year ended December 31st, 1955: 152,481 passengers; 2,509 tons of freight and mail carried; 517,109 ton-miles flown; 300 staff. Financial details not available.

Linea Aeropostal Venezolana—LAV, was founded in 1933 when the Venezuelan Government took over the routes and equipment of the Cie. Gle. Aéropostale which had begun operating in Venezuela in 1930. LAV began flying with Latécoère 28 monoplanes and the first new type to be introduced was the Electra. LAV, which took over TACA de Venezuela in 1952, now has more than 16,000 miles of routes in Venezuela and to Havana, Lima, Lisbon, Madrid, Miami, New York, Panama, Rome and Trinidad.
Head Office: Caracas, Venezuela.
Executives: Col. L. Calderon, president.
Fleet: three Viscount 749, two L-1049C, three Constellation, 18 DC-3, two Martin 2-0-2, C-46; on order, one L-1049G.
Results for year ended December 31st, 1954: 222,554 passengers; 4,481,000 freight ton-km and 668,000 mail ton-km flown; total ton-km 18,875,000; 1,811 staff.
Financial details not available.

Lineas Aereas Costarricenses S.A. "LACSA," was founded in 1945 by Pan American Airways, the Government of Costa Rica and Costa Rican private interests. P.A.A. originally held 36 per cent of the stock but is believed now to hold a smaller percentage. Scheduled operations began in 1946. In 1952 LACSA took over TACA de Costa Rica, which had operated since 1939 as one of the units of the TACA system. LACSA operates a network of internal services based on San José and also routes to Panama, El Salvador, Mexico, Cayman Islands, Cuba and Miami.
Head Office: San José, Costa Rica.
Executives: F. Terán, president; R. E. Smith, general manager; F. Bonilla, asst. general manager; C. Holst, operations manager.
Fleet: three DC-3, four Curtiss C-46, two Convair 340.
Results for year ended December 31st, 1955: 106,216 passengers; 8,379 tons of freight and 180 tons of mail carried; 4,350,628 ton-miles flown; total costs, £871,105; total revenue, £955,485; 348 staff.

Lineas Aereas de Nicaragua, S.A.—LANICA, was founded in June 1945 with Pan American Airways holding 40 per cent of the company's capital. Internal services were begun in 1946 with a fleet consisting of two Boeing 247 aircraft. At present the company serves ten points in Nicaragua in addition to its home city, Managua.
Head Office: Managua, Nicaragua.
Executives: Col. L. A. Somoza, president; A. Sacasa, vice-president; F. P. Powers, vice-president; F. Gaitán, treasurer; C. A. Tellería, secretary.
Fleet: six DC-3, one Curtiss C-46.
Results for year ended December 31st, 1955: 21,852 passengers; 14,459 tons of freight and 48 tons of mail carried; 1,426,811 ton-miles flown; total costs, £271,095; total revenue, £297,636; 189 staff.

Lineas Aereas del Estado—LADE, was founded in September 1940 as a branch of the Argentine Air Force to operate services to isolated areas, and which could not be worked as commercial undertakings. After the war these services were taken over by commercial airlines but LADE is again flying certain domestic services.
Head Office: Buenos Aires, Argentina.
Executives: Names not available.
Fleet: Viking, DC-3.
Traffic statistics not available.

Linee Aeree Italiane, S.p.A.—LAI, was formed in 1946 with Italian interests holding 60 per cent of the stock and T.W.A. 40 per cent. The first routes, from Rome to Milan, Palermo and Cagliari, were opened in April 1947. In 1952 LAI absorbed Ali Flotte Riunite thus reducing the number of post-war Italian airlines to two. Transatlantic services were inaugurated in July 1950. LAI's present system includes domestic and European operations and routes to Boston, New York, Beirut, Damascus, Baghdad and Teheran.
Head Office: Rome, Italy.
Executives: Prince Merantonio Pacelli, president; Gen. L. Gallo, director general.
Fleet: two DC-6B, three DC-6, four Convair 240, 14 DC-3; on order, Convair 440 and four L-1649A.
Results for year ended December 31st, 1954: 186,206 passengers; 2,031,000 freight ton-km and 1,467,000 mail ton-km flown; total ton-km 18,549,000; 1,075 staff.
Financial details not available.

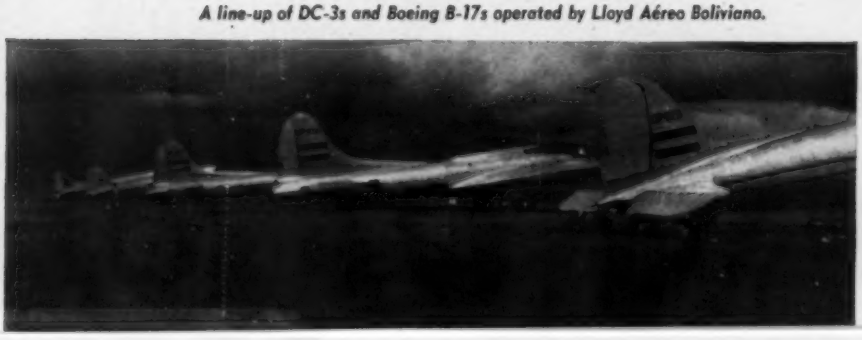
Lloyd Aéreo Boliviano S.A., was founded by German colonists in 1925 and opened in that year a route between Cochabamba and Santa Cruz. The company was taken over as the Bolivian national airline in 1941 and Panagra was given a contract to administer the airline. The government of Bolivia now holds in excess of 50 per cent of the stock of L.A.B.
The airline operates a network of domestic services and also a route to Arica in Chile.
Head Office: Cochabamba, Bolivia.
Executives: Cmdte. W. Lehm, general manager; E. Gonzalez, asst. manager.
Fleet: 11 DC-3, two DC-4, two Boeing B-17.
Results for year ended December 31st, 1955: 155,251 passengers; 27,661 tons of freight and 48 tons of mail carried; 14,414,126 ton-km flown; total costs (to November), £5,324,360; total revenue (to November), £5,232,387; 1,452 staff.

Loftleidir—see Icelandic Airlines.

Loide Aéreo Nacional S.A., was established in its present form in 1951 by amalgamation with Linhas Aereas Paulistas and Transportes Aereos Bandeirantes. About 6,000 miles of route are operated within Brazil, many second-class services being flown.
Head Office: Rio de Janeiro, Brazil.
Executives: General M. G. Jacques, president.
Fleet: 17 Curtiss C-46; on order, four C-46 (1956).

Malayan Airways' DC-3 "Quail" seen at the new Singapore Airport.

A line-up of DC-3s and Boeing B-17s operated by Lloyd Aéreo Boliviano.



WORLD AIRLINE DIRECTORY . . .

Results for year ended December 31st, 1955: 94,399 passengers; 6,195 tons of freight and 159 tons of mail carried; 7,919,972 ton-km flown; total costs, £3,963,844; total revenue, £4,496,687.

Los Angeles Airways, Inc., was incorporated on May 11th, 1944. The company began a mail service circuit in the San Fernando Valley on October 1st, 1947, and thereby became the first helicopter-scheduled service operator. Two further circuits were opened, one on October 15th and the other on January 8th, 1948. A shuttle service was also established between the Los Angeles post office roof and the International Airport. Passenger services were inaugurated in November 1954 and these services now link ten points with Los Angeles International Airport—S.55s are used on these services and the S-51s operate the mail flights.
Head Office: Los Angeles, Cal., U.S.A.
Executives: C. M. Belinn, president; M. J. Burke, secretary; J. T. Kane, treasurer.
Fleet: four S-55, three S-51.
In 1954 the company carried about 3,500 tons of mail and express.

Lufthansa—see Deutsche Lufthansa A.G.

Mackey Airlines, Inc., now operating scheduled passenger services from St. Petersburg, Tampa, Fort Lauderdale and West Palm Beach to Nassau in the Bahamas, was incorporated as Mackey Air Transport in 1946. Scheduled operations were approved in 1952 and inaugurated on January 2nd, 1953. Applications have been filed for routes to Havana and other places in the Caribbean area.
Head Office: Fort Lauderdale, Florida, U.S.A.
Executives: J. C. Mackey, president; L. J. Povey, vice-president; J. H. Popham, secretary.
Fleet: four DC-3, two DC-4; on order, two Fokker Friendship (October and November 1957).
Results for year ended December 31st, 1955: 32,683 passengers; 40 tons of freight carried; 889,029 ton-miles flown; 62 staff. Figures are for scheduled operations only. Financial details not available.

MacRobertson-Miller Airlines, Ltd., was brought into being in 1955 by the merger of MacRobertson-Miller Aviation Co. (Pty.), Ltd., and Airlines (W.A.), Ltd. MacRobertson-Miller Aviation was founded in 1927 and was successor to the Commercial Aviation Co., founded by Capt. H. C. Miller shortly after the first war. Airlines (W.A.) was established in 1935 and the two companies had extensive experience in the operation of airlines throughout the length of the west coast of Australia and the allied inland districts. It is over this entire area that the new company is now operating scheduled services.
Head Office: Perth, Western Australia.
Executives: C. N. Kleinig, managing director; H. C. Miller, regional director; J. W. Cameron, executive director; E. C. Gare, secretary; K. Cohen, operations manager.
Fleet: five DC-3, three Dove, five Anson.
Results for year ended December 31st, 1955: 46,043 passengers; 3,078 tons of freight and 74 tons of mail carried; 411 staff. Other details not available.

Magyar Légiközlekedési Vállalat—MALEV was founded as Maszovlet (Hungarian - Soviet Air Traffic Company) in 1946. The U.S.S.R. withdrew its interest in 1954 and the present title was then adopted. The airline now operates domestic services and to Sofia, Berlin, Warsaw, Budapest, Prague and Bucharest.
Head Office: Budapest, Hungary.
Fleet: Li-2.

Malayan Airways, Ltd., founded in 1947, has as its main shareholders Blue Funnel Line, Straits Steamship Co., and B.O.A.C. (with a minority interest). DC-3s operate from Singapore to points in Malaya and to Medan, Palembang, Bangkok, Sarawak and North Borneo. North Borneo - Brunei - Sarawak local services are operated with D.H.89s.
Head Office: Singapore.
Executives: F. L. Lane, chairman; R. P. Mollard, managing director, J. Skeldon, manager; A. G. Beohm, traffic manager.
Fleet: 11 DC-3; three D.H.89.
Results for year ended December 31st, 1955: 144,774 passengers; 494 tons of freight and 56 tons of mail carried; 4,883,870 ton-km flown; 752 staff. Financial details not available.

MALEV—see Magyar Légiközlekedési Vállalat.

Malta Airlines, The. This concern is an associate of B.E.A. and consists of the Malta Airways Company, Ltd., and its wholly owned subsidiary Air Malta, Ltd. B.E.A. operates the routes of The Malta Airlines and these are between Malta and Italy, France, the United Kingdom, Corsica, Libya and Egypt. The B.E.A. shareholding is 34 per cent.
Head Office: Valetta, Malta G.C.
Executive: Lt-Col. R. Strickland, chairman.
Fleet: B.E.A. aircraft supplied and operated by agreement.
In the financial year 1954-55, The Malta Airlines made a net profit of £1,400.

Mandated Airlines, Ltd., was founded in 1936 as a subsidiary of W. R. Carpenter and Co., Ltd., the aviation assets of which were taken over by Qantas in 1934. Mandated became an independent company, and in 1937 the airline was awarded a contract for passenger, mail and cargo work in New Guinea. Mandated now operates scheduled services from Lae to eight points including Goroka, Wau, Port Moresby and Rabaul. Charter and other work is also undertaken.
Head Office: Lae, New Guinea.
Fleet: two DC-3, three D.H.84.
Traffic statistics not available.

Maritime Central Airways, Ltd., is a private company which began regular service in 1941 between Charlottetown on Prince Edward Island and Moncton, New Brunswick. With its mixed fleet the company undertakes charter work and maintains regular services to New Glasgow, Halifax, the Magdalen Isles, Summerside, Moncton, St. John, Fredericton, Goose Bay, Gander and St. John's.
Head Office: Charlottetown, Prince Edward Island, Canada.
Executives: J. K. Curren, president; F. T. Briggs, vice-president; C. F. Burke, managing director; A. M. Clark, secretary/treasurer.
Fleet: four York, one DC-4, one Anson, one Beaver, one Bristol 170, five Canso, four Curtiss C-46, nine DC-3, three Lockheed Electra.
Results for year ended December 31st, 1955: 31,106 passengers; 283 tons of freight and 413 tons of mail carried; 220,751 ton-miles flown; 461 staff. Financial details not available.

Matane Air Services, Ltd., was founded in 1947 to operate charter services across the St. Lawrence from Matane. Regular services were opened from Matane to Godbout, Trinity Bay, Pentecote and Shelter Bay. It is possible that this company is no longer flying regular services and the points listed here are now served by Quebecair. The details below have been received from Matane Air Services.
Head Office: Matane, Quebec, Canada.
Executives: E. Burnett, president; G. Burnett, managing director.
Fleet: three Cessna Crane, one Piper PA-12, one Lockheed 10A; on order, one Lockheed 10A (1956).
Results for year ended December 31st, 1955: 8,610 passengers; 29 tons of freight carried; 1,691 ton-miles flown; eight full time and six part time staff.
Financial details not available.

Mercury International Company Airlines, operates local services between San Bernardino and Los Angeles, Riverside, Big Bear Lake and Victorville.
Head Office: San Bernardino, Cal., U.S.A.
Fleet: Cessna 195, Beech Bonanza.

Middle East Airlines Co. S.A.—MEA, was founded as a private concern in 1945. In 1949 Pan American Airways acquired 36 per cent of MEA's stock but the company has now withdrawn and B.O.A.C. holds the controlling interest in MEA. Services are operated from Beirut to Aleppo, Ankara, Athens, Baghdad, Bahrein, Cairo, Dhahran, Jerusalem, Kuwait, Nicosia and Rome. The Viscounts introduced last year, following the brief use of Hermes 4s, were supplied by Hunting-Clan Air Transport *via* MASCO.
Head Office: Beirut, Lebanon.
Executives: H.E. Sa'eb Bey Salaam, chairman; Sheikh Najib Alamuddin, managing director.
Fleet: two Viscount 732, seven DC-3.
In 1954 MEA carried more than 45,000 passengers and 1,000 tons of freight and mail.

Midway Airlines has since 1951 been operating scheduled services linking the Chicago airports. Cessna 195A single-engined aircraft were operated until their recent replacement by Doves. The latest published schedules showed up to 15 services a day between Midway Airport and Northbrook Sky Harbor, 11 a day between Midway and St. Charles, and four on Mondays to Fridays between Midway and Meigs Field. Financial difficulties brought about the suspension of services on March 3rd this year and it is reported that new financial backing is being sought.
Head Office: Chicago, Ill., U.S.A.
Executives: H. Riddle, president.
Fleet: Dove, Cessna 195.

Minhaiduy (Airline of People's Democratic China) is successor to Skoga, which was formed in 1952 as a joint Soviet - Chinese undertaking. In 1954 Soviet participation was withdrawn. Minhaiduy now has about 9,500 miles of routes with a considerable domestic

A Panagra Douglas DC-7B at Lima Airport, Peru. The weather radar nose can be distinguished.

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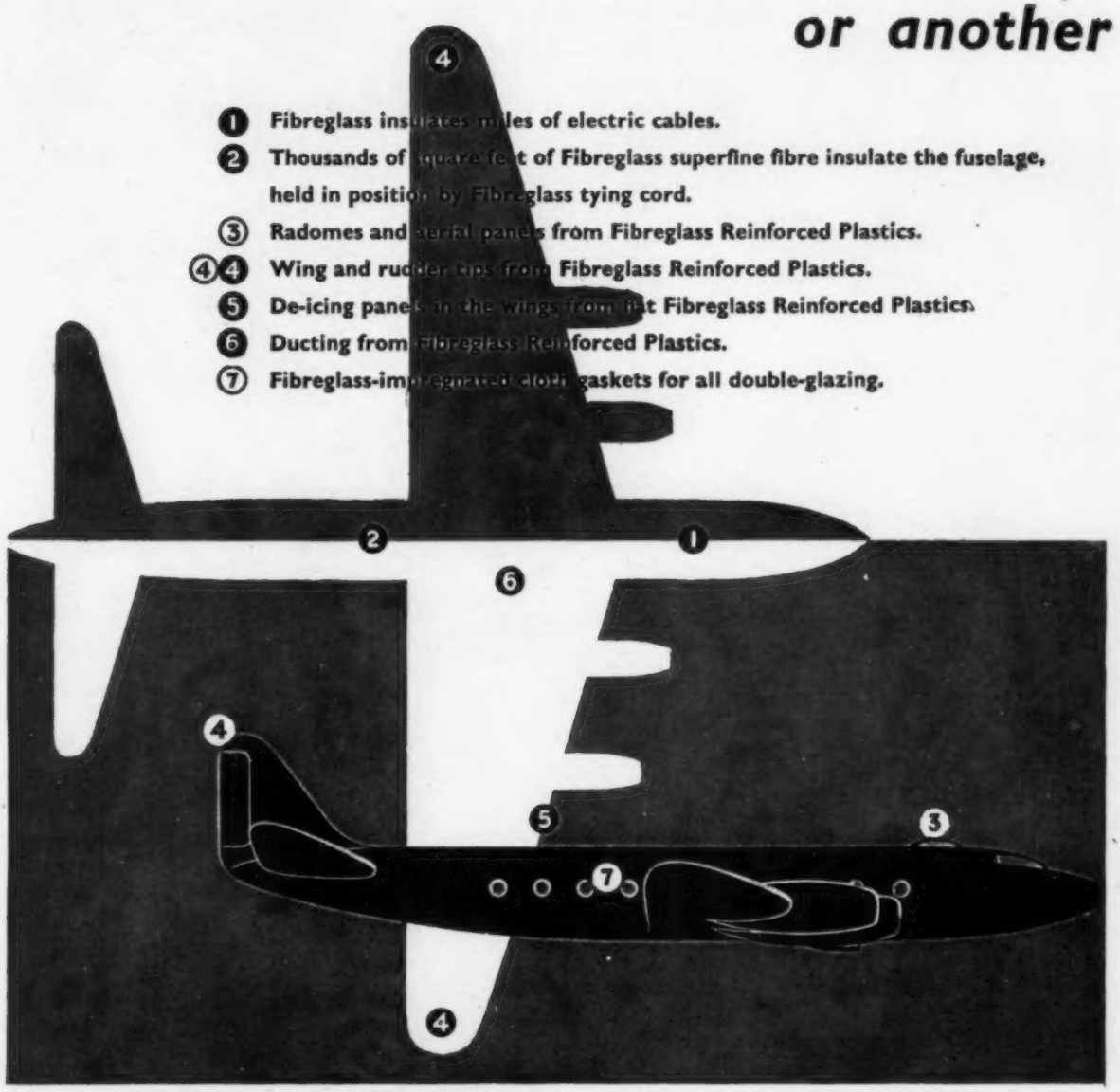
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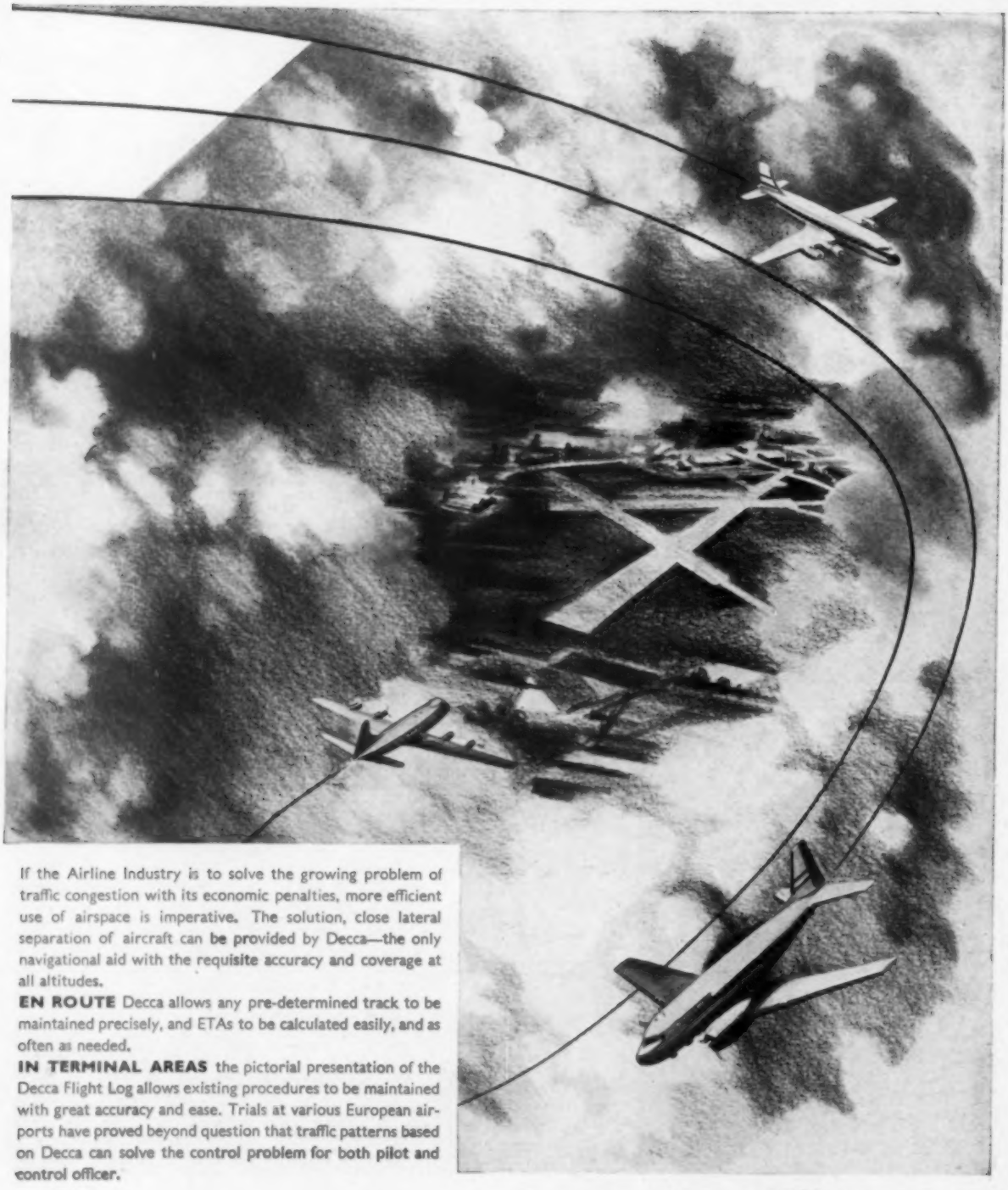

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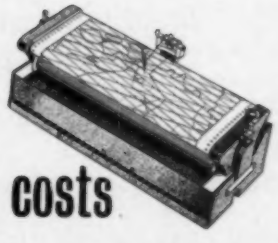

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WORLD AIRLINE DIRECTORY . . .

network and routes from Urumchi to Alma-Ata, and from Peking through Mongolia to Irkutsk, as part of the Aeroflot routes to and from Moscow.
Head Office: Peking, China.
Fleet: Il-14, Li-2, C-46, Convair 240.

Misrair S.A.E. — Egyptian Airlines was founded as Misr Airwork in 1932. The present name was taken in 1949 and all the capital is now Egyptian-owned. Scheduled services were begun in 1933 and the company now operates an extensive network of services in the Middle East and to Europe. Further route extensions are contemplated, including one between Cairo and London.
Head Office: Cairo, Egypt.
Executives: Air Commodore M. S. El Miligi, general manager; A. H. Mokbel, acting general manager; M. F. Raaft, deputy general manager (commercial); H. Tewfik, deputy general manager (technical); Capt. H. Shams, operations manager.
Fleet: three Viscount 700, seven Viking, one Beech D.18S.
Results for year ended December 31st, 1955: 77,050 passengers; 1,682 tons of freight and 67 tons of mail carried; 5,674,106 ton-km flown; 1,190 staff. Financial details not available.

Mohawk Airlines, Inc., was founded in 1945 as an intrastate carrier with the title Robinson Airlines. The company took its present name in 1952 and is now operating about 1,300 miles of routes in New York, New Jersey and New England. During 1954 Mohawk operated helicopter services between Newark and Liberty/Monticello. An S-55 was used but this venture was short-lived. As Swissair's Convair Metropolitans are delivered this year the company's CV-240s will be delivered to Mohawk Airlines.
Head Office: Ithaca, N.Y., U.S.A.
Executives: E. Victor Underwood, chairman; R. E. Peach, president; J. R. Carver, vice-president/secretary; C. A. Benscoter, vice-president operations; W. D. Bosworth, treasurer.
Fleet: 11 DC-3, four Convair 240; on order, seven Convair 240.
Results for year ended December 31st, 1955: 276,477 passengers; 1,048 tons of freight and 303 tons of mail carried; 5,076,880 ton-miles flown; total costs £1,539,631; total revenue £1,506,302; 464 staff.

NAB—see Navegacao Aerea Brasileira.

National Airlines, Inc., known as *Airline of the Stars* was founded as National Airlines System in October 1934 as a regional operator with a 142 mile route between St. Petersburg and Daytona Beach. The airline now operates a network extending from New York and Washington down the eastern seaboard to Tampa and Miami. Routes from Jacksonville and Tampa stretch west to New Orleans, and Havana is served by routes from New York, Tampa and Miami. Throughplane services link New Orleans with California. For some time National operated experimental helicopter services in the Miami area with an S-55.
Head Office: Miami, Florida, U.S.A.

One of the gaily red, white and blue painted Boeing Stratocruisers of Northwest Airlines.

Executives: G. T. Baker, president; J. C. Brawner, vice president/treasurer; R.P. Foreman, secretary; L. W. Dymond, asst. vice president operations; W. A. Perry, vice president/general sales manager; H. K. Pike, asst. vice president maintenance and engineering.
Fleet: 10 Lodestar, 12 Convair 340, four DC-6, eight DC-6B, four DC-7; on order, six Convair 440 (1956), four DC-7B (1957), six DC-8 (1959-60), 23 Lockheed Electra (1959-61).
Results for year ended December 31st, 1955: 1,292,675 passengers; 8,640 tons of freight and 4,546 tons of mail carried; 100,954,618 ton-miles flown; total costs, £18,308,909; total revenue, £15,570,021; 3,503 staff.

National Greek Airlines T.A.E. was founded in July 1951 by the amalgamation of T.A.E., Hellenic Airlines and the smaller A.M.E. Following financial difficulties the company was taken over by the Greek Government in June 1955 and at present its future is somewhat uncertain. T.A.E. operates domestic services and to Turkey, Cyprus, Israel, Egypt, Italy, France and the United Kingdom.
Head Office: Athens, Greece.
Executives: A.V-M. N. Averoff, president; S. Damaskinos, commercial manager; J. Papaletsos, financial manager; C. Dannis, technical manager.
Fleet: one DC-4, 14 DC-3, one Fairchild Argus.
Results for year ended December 31st, 1955: 144,291 passengers; 2,712 tons of freight and 261 tons of mail carried; 5,916,377 ton-km flown; 815 staff. Financial details not available.

Navegacao Aerea Brasileira, NAB., was established in 1939 and began operations in 1941 over a coastal route linking Rio de Janeiro and Fortaleza. In 1948, when the route mileage had reached nearly 5,000, financial difficulties caused the suspension of operations. The company began work again in 1951 and at present NAB serves a coastal route from Rio to Vitoria, and an inland route to Belo Horizonte.
Head Office: Rio de Janeiro, Brazil.
Executives: Cmdr. G. X. de Oliveira, general manager.
Fleet: DC-3.
Traffic statistics not available.

New York Airways, Inc., was formed in 1949 with the object of operating scheduled helicopter services in the New York area. Mail operations between the New York airports were inaugurated on October 15th, 1952. Mail services were subsequently opened to suburban areas, and passenger services linking New York International, La Guardia and Newark airports began in the summer of 1953. In addition to its airport links the company now serves the New York area, New Jersey and Connecticut.
Head Office: La Guardia Airport, New York.
Executives: R. L. Cummings, Jnr., president; H. Brock, vice-president; W. W. Hogan, treasurer; M. K. Skadden, secretary.
Fleet: five Sikorsky S-55; on order, eight S-58 (1956-57).
Results for year ended December 31st, 1955: 23,967 passengers; 1,116 tons of freight and 706 tons of mail carried; 82,948 ton-miles flown; financial details not available; 128 staff.

New Zealand National Airways Corporation —NAC. This company was founded by Act of Parliament in 1945 to take over and expand the operations of Air Travel (N.Z.), Ltd., Cook Strait Airways, Ltd., and Union Airways of New Zealand, Ltd. Following the change of Government in 1949 an attempt was made to sell NAC but this was not successful. NAC operates over some 3,000 miles of routes in and between North and South Islands.
Head Office: Wellington, C.I., New Zealand.
Executives: Sir Leonard Isitt, chairman; J. J. Busch, general manager; H. C. Walker, operations manager; W. J. Jennings, commercial manager.
Fleet: 28 DC-3, four Heron, six D.H.89, three D.H.83; on order, three Viscount 800 series.
Results for year ended December 31st, 1954: 379,079 passengers; 2,649,000 freight ton-km and 278,000 mail ton-km flown; total ton-km 16,023,000; 1,093 staff.
Financial details not available.

North Central Airlines, Inc., was founded in 1944 as Wisconsin Central Airlines. Approval for the operation of routes from Chicago to cities in Wisconsin, eastern Minnesota and Upper Michigan was given in 1946 and operations were begun with Lockheed Electras in February 1948. The company adopted its present name at the end of 1952, now operates about 2,700 miles of routes in the Great Lakes area, and is awaiting C.A.B. approval for the purchase of Lake Central Airlines, which would extend its route system east as far as Pittsburgh.
Head Office: Minneapolis, Minnesota, U.S.A.
Executives: H. N. Carr, president; B. Sweet, secretary/treasurer; F. N. Buttomer, vice-president traffic and sales; A. D. Niemeyer, vice-president operations; R. H. Benido, vice-president maintenance and engineering.
Fleet: 20 DC-3.
Results for year ended December 31st, 1955: 430,445 passengers; 298,227 express ton-miles and 139,697 mail ton-miles flown; 825 staff. Other details not available.

Northeast Airlines serves New England and has routes from that area to New York and Montreal, while its projected operations include services to Quebec, Washington and Florida. The company was founded by the Boston and Maine and Maine Central Railroads as Boston-Maine Airways, and services were begun between Boston and Waterville on August 11th, 1933. The present name was taken in 1940. Mergers with Capital Airlines and Delta Air Lines have been considered but have not taken place.
Head Office: Boston, Mass., U.S.A.
Executives: P. F. Collins, chairman; G. E. Gardner, president (portrait, p. 483); A. A. Lane, vice-president operations; D. W. H. Mackinnon, vice-president maintenance and engineering; H. Heard, treasurer.
Fleet: 12 DC-3, six Convair 240; on order, 10

The prototype Boeing 707; a total of 88 has been ordered by eight operators to date.

WORLD AIRLINE DIRECTORY . . .

DC-6B (January, February, March 1957).
Results for year ended December 31st, 1955: 582,478 passengers; 1,827 tons of freight and 710 tons of mail carried; 11,346,893 ton-miles flown; 962 staff. Financial details not available.

Northern Consolidated Airlines, Inc., was founded in 1945 to integrate the operations of a number of small airlines in southwest Alaska. The company now has about 3,000 miles of routes worked by scheduled and non-scheduled flights.
Head Office: Anchorage, Alaska.
Executives: R. I. Petersen, president/general manager; R. J. Stevenson, vice president; S. B. Fitzhugh, treasurer; V. R. Davis, secretary/general traffic manager; W. R. Rice, operations manager.
Fleet: three DC-3, 12 Cessna T-50; on order, Frye F-1 Safari.
Results for year ended December 31st, 1955: 15,594 passengers; 2,135 tons of freight and 776 tons of mail carried; 1,376,052 ton-miles flown; total costs, £607,561; total revenue, £685,033; 115 staff.

The Aeroflot Tu-104, which recently visited London Airport, seen at Vnukovo Airport, Moscow.

Northern Wings, Ltd.—Les Ailes du Nord Ltée, flies non-scheduled services and is believed to operate a scheduled route of about 400 miles from Seven Islands to Blanc Sablon on the Quebec/Labrador border.
Head Office: Quebec, P.Q., Canada.
Executives: Dr. G. Cyr, president; Me. H. Beaupré, secretary; J. L. Roy, controller; T. Coghlan, general manager.
Fleet: two DC-3, two Canso, two Norseman, two Beaver, one Beech 17, one Anson V.
Results for year ended December 31st, 1955: not available.

Northwest Airlines, Inc., was incorporated on August 1st, 1926, as Northwest Airways and mail services were begun between Minneapolis/St. Paul and Chicago on October 1st that year, using a leased Curtiss Oriole and a Thomas Morse. The company's first owned fleet consisted of three Stinson Detroiters purchased in 1926 and the first passenger services were opened in July 1927.
The present corporate name was adopted in 1934. For publicity purposes the airline trades as Northwest Orient Airlines. By 1945 a transcontinental route had been established and in 1947 the company began services to the Far East. The present system comprises 20,000 miles of routes stretching from coast to coast of the U.S.A.; into Canada and Alaska; to Hawaii; and across the Pacific to Japan, South Korea, Okinawa, Manila, Formosa and Hong Kong.
Head Office: St. Paul, Minnesota, U.S.A.
Executives: C. Hunter, chairman; D. W. Nyrop, president (portrait, p.482); M. S. Mackay, executive vice-president; F. C. Judd, vice-president operations and engineering; G. M. Bain, vice-president sales; L. S. Holstad, comptroller; W. J. Eiden, treasurer.
Fleet: four L-1049G, nine Stratocruiser, five DC-6B, 17 DC-4, seven DC-3; on order, 12 DC-6B (1957-58); eight DC-7C (1957).
Results for year ended December 31st, 1955: 1,344,369 passengers; 10,839 tons of freight and 7,768 tons of mail carried; 133,729,467 ton-miles flown; total costs, £23,808,978; total revenue, £25,458,215; 5,452 staff.

Ostermans Aero A.B., was formed in 1943 and is the sole Scandinavian civil operator of helicopters. Most of the company's work is of a contract nature but every winter since 1948 Ostermans have operated regular mail service between Stockholm and numerous points in the Stockholm Archipelago. This service has been operated with very high standards of reliability and regularity. During 1954 the company operated S-55 services, for a short time, between Sweden and Denmark.
Head Office: Stockholm, Sweden.
Executive: Maj-Gen. P. R. af Uhr, operations manager.
Fleet: two S-55, seven Bell 47, five Seabee.
Traffic statistics not available.

Ozark Air Lines, Inc., was incorporated under the laws of the State of Missouri on September 1st, 1943 and filed applications for C.A.B. certificate to serve 28 cities in six states. Charter and intra-state services in Missouri operated during 1944 and 1945. Ozark was awarded a three-year certificate in 1950, took over the assets and staff of Parks Air Lines and began scheduled operations between St. Louis and Chicago on September 26th, 1950.
The company now has permanent certification and operates 3,507 miles of routes serving 41 cities in eight Mid-West states. Applications to the C.A.B., if granted, would add a further 4,600 miles of routes and 27 cities in nine Mid-West and Western states.
Head Office: St. Louis, Missouri, U.S.A.
Executives: B. T. Mattingly, chairman; L. Hamilton, president; F. W. Jones, treasurer; A. G. Heyne, secretary.
Fleet: 16 DC-3.
Results for year ended December 31st, 1955: 247,031 passengers; 508.85 tons of mail carried; 3,629,743 ton-miles flown; total costs, £1,557,210; total revenue, £1,535,745; 537 staff.

Pacific Northern Airlines Inc., calls itself "The Alaska Flag Line" and came into being in 1932 as Woodley Airways. A post office mail contract was awarded in 1934 and in 1938 the airline received C.A.B. certification. The present company was incorporated in 1945. Services are operated within Alaska and between Alaskan points and Seattle and Portland.
Head Office: Seattle, Washington, U.S.A.
Executives: A. G. Woodley, president; J. A. Cunningham, vice-president operations.
Fleet: four DC-4, four DC-3, one Lockheed 12A, one Cessna Crane and three leased L-749 Constellation.
In 1954 Pacific Northern carried nearly 80,000 passengers and flew more than 10,000,000 revenue ton-miles.

Pacific Southwest Airlines—PSA, operates services linking San Diego, Los Angeles and San Francisco.
Head Office: San Diego, Cal., U.S.A.
Fleet: DC-4.

Pacific Western Airlines, Ltd.—PWA, was founded in 1946 as Central British Columbia Airways. In 1953 the present title was adopted after acquiring the licences and facilities of Associated Air Taxi, Ltd. Some routes were operated in competition with Queen Charlotte Airlines and in mid-1955 PWA bought up QCA. Early this year PWA acquired the stock of Associated Airways. The company is now Canada's third largest airline, coming next to TCA and Canadian Pacific. Pacific Western has an extensive network of routes in British Columbia and also serves Alaska.
Head Office: Vancouver, B.C., Canada.
Executives: K. J. Springer, chairman; R. Baker, president; D. F. Granger, secretary/treasurer.
Fleet: includes DC-4, DC-3, C-46, Canso, Anson 5, Norseman, Stranraer, Beaver, Stinson 108, Junkers-W34, Mallard, Cessna 180, Fairchilds.
Traffic statistics not available.

Pakistan International Airlines Corporation was founded by the Government of Pakistan on April 1st, 1955, when P.I.A. took over Orient Airways. As a company P.I.A. had been founded in 1951 to operate services to Europe; its first actual operations were between East and West Pakistan in 1954. Service to London was begun early in 1955. The Corporation is now responsible for the operation of all Pakistani air services.
Head Office: Karachi, Pakistan.
Executives: Z. Ahsan, general manager; M. M. Salim, executive asst. to general manager; N. G. Hemsworth, flight operations manager; E. Jamall, engineering manager; J. S. Mirza, traffic and sales manager.
Fleet: three L-1049C, two Convair 240, 11 DC-3.
Results for year ended December 31st, 1955: 113,165 passengers; 3,067 tons of freight and 2,061 tons of mail carried; 3,228,845 ton-miles flown; 2,108 staff. Financial details not available.

Panagra—see Pan American-Grace Airways, Inc.

Panair do Brasil, S.A. In October 1929 the Brazilian Government authorized New York, Rio and Buenos Aires Line Inc. (NYRBA) to operate services in Brazil, and Nyrba do Brasil was created as a Brazilian subsidiary. A service was begun between Rio de Janeiro and Belem. In August 1930 Pan American Airways took over both NYRBA and Nyrba do Brasil and the latter became Panair do Brasil on September 15th that year. PAB developed services with Sikorsky S-38 and Consolidated Commodore flying-boats. These were later replaced by Fairchild 91s and Sikorsky S-43s and, although Panair now operates an extensive Brazilian and South American route network with DC-3s and Constellations, Catalinas still operate the Amazon routes. Panair operates services from South America to London, Hamburg, Frankfurt, Düsseldorf, Paris, Zürich, Rome, Madrid, Lisbon, Istanbul and Beirut.
Head Office: Rio de Janeiro, Brazil.
Executives: Dr. P. Sampaio, president; Dr. C. C. Araujo, general manager; Dr. C. P. de Mello, treasurer.
Fleet: 11 Constellation, eight DC-3, Catalina; on order, four DC-7C.
Results for year ended December 31st, 1954: 354,119 passengers; 6,557,000 freight ton-km and 1,888,000 mail ton-km flown; total ton-km 43,310,000; 3,890 staff.
Financial details not available.

Pan American - Grace Airways, Inc., (Panagra), was founded in 1929 by the Grace Shipping Line and Pan American Airways, each holding half the shares. In 1928 Pan American Airways was awarded a mail contract for a service from Florida to Panama, and in the following year Panagra successfully bid for a mail contract covering a route from Panama down the west coast of South America and across the Andes to Buenos Aires. By the end of 1929 the complete route was in operation. The company's routes have been gradually extended and after a long fight, much of it against Pan American, Panagra has succeeded in securing entry to New York through interchange agreements with P.A.A. and National Airlines. Operating over the routes of the three companies Panagra DC-7Bs were introduced on August 1st, 1955, and under the title of El Inter Americano daily services are flown between New York and Buenos Aires *via* Miami, Panama, Lima and Santiago.
Head Office: New York, U.S.A.
Executives: A. B. Shea, president (portrait, p.

482); D. Campbell, vice-pres./gen. mgr., T. J. Firkland, vice-president operations; K. A. Lawder, vice-president/comptroller; E. G. Bern, vice-president traffic and sales.
Fleet: five DC-3, three DC-4, four DC-6, four DC-6B, five DC-7B; on order, one DC-7B (July 1957), four DC-8 (1960).
Results for year ended December 31st, 1955: 136,408 passengers; 3,248 tons of freight and 479 tons of mail carried; 20,473,905 ton-miles flown; 1,396 staff. Financial details not available.

Pan American World Airways, Inc., is the only major U.S. airline concerned entirely with overseas operation. Pan American Airways, Inc., was founded in March 1927 and began operation of its first route, between Key West and Havana, in October 1927. Fokker monoplanes were used. P.A.A. extended its operation throughout the Caribbean and built up flying-boat services, which by 1931 had reached the Argentine. P.A.A. was a great pioneer of transocean flying and by 1935 had established services between San Francisco and Manila *via* Honolulu, Midway, Wake and Guam. Hong Kong was served from 1936. In 1937 New York - Bermuda services were opened in co-operation with Imperial Airways and in the same year the two companies began trans-atlantic survey flights. Passenger service began in 1939. The airline now operates a route network of more than 60,000 miles, serves all continents and has regular round the world flights. Pan American took its present title in 1949. The airline has absorbed a number of other airlines including American Overseas Airlines and it has interests in numerous carriers,

Juan T. Trippe, president, Pan American World Airways.

particularly in Latin America. P.A.A. has been a particularly strong advocate of cheap fares and mass air travel. Pan American is also operating the 1,000 mile long missile range, stretching from Florida to beyond Puerto Rico, for the U.S.A.F.
Head Office: New York, U.S.A.
Executives: J. T. Trippe, president; J. C. Leslie, vice-president administration; S. F. Pryor, vice-president/asst. to president; H. J. Friendly, vice-president/general counsel; W. L. Morrison, vice-president Latin American Division; H. E. Gray, vice-president Atlantic Division; C. M. Young, vice-president Pacific-Alaska Division.
Fleet: 26 Stratocruiser, seven DC-7B, 44 DC-6B, three DC-6A, 26 DC-4, five L-49, five Convair 240, four DC-3; on order, 25 DC-8 (start 1959) six Boeing 707-120 (start 1958), 17 Boeing 707-320 (start 1958), 33 DC-7Cs (1956). Four DC-6 leased from Panagra.
Results for year ended December 31st, 1954: 1,753,602 passengers; 83,770,000 freight ton-km and 38,655,000 mail ton-km flown; 451,231 total ton-km flown; total costs, £72,014,954; total revenue £78,181,965; 17,605 staff.

Philippine Air Lines—PAL, began in 1932 as the Philippine Aerial Taxi Company. The company was reorganized and took its present name in 1941. Following the war the company developed its operations, and in 1947 and 1948 PAL took over two other Philippine concerns—Far Eastern Air Transport and Commercial Air Lines. Long distance overseas services were inaugurated to Europe and across the Pacific to the U.S.A., but in 1954 PAL abandoned its long distance services and now operates only within the Philippine Republic and to Hong Kong.
Head Office: Manila, Republic of the Philippines.
Executives: A. Soriano, president; R. Yoga, vice-president/treasurer.
Fleet: 29 DC-3, three Convair 340, two Otter, four Norseman, one Hiller UH-12B; on order, two Viscount.

Pan American's first DC-7C is named "Clipper Bald Eagle."

Results for year ended December 31st, 1954: 258,439 passengers; 3,696,000 freight ton-km and 433,000 mail ton-km flown; total ton-km 15,680,000; 1,757 staff.
Financial details not available.

Piedmont Airlines—see Piedmont Aviation, Inc.

Piedmont Aviation, Inc., was founded in 1940 as a fixed base operator and began local service operations in 1948. Trading as Piedmont Airlines the company now has about 2,800 miles of routes in North and South Carolina, Tennessee, Virginia and West Virginia, Kentucky and Ohio.
Head Office: Winston-Salem, North Carolina, U.S.A.
Executives: T. H. Davis, president/treasurer; R. D. Hager, vice-president traffic; H. K. Saunders, vice-president operations; M. F. Fare, secretary.
Fleet: 17 DC-3.
Results for year ended December 31st, 1955: 362,233 passengers; 693 tons of freight and 629 tons of mail carried; 7,407,050 ton-miles flown; total costs £2,285,330; total revenue £2,292,350; 767 staff. Financial details are preliminary.

Pioneer Air Lines—see Continental Air Lines.

PLUNA—see Primeras Lineas Uruguayas de Navegacion Aerea.

Polskie Linie Lotnicze—LOT, was formed by the Government in 1929 to take over the operations of the private companies Aerolot and Aero of Poznan. By the start of the war LOT had established itself as a well run airline with a modern fleet of Electras and Lockheed 14s. Part of this fleet was brought to England and served with B.O.A.C. The airline flies domestic services and also to Belgrade, Berlin, Brussels, Bucharest, Budapest, Copenhagen, Moscow, Paris, Prague, Sofia, Stockholm, Vienna and Vilno.
Head Office: Warsaw, Poland.
Executives: S. Minorski, general director; M. Rolski, commercial director.
Fleet: Li-2, Il-14, Il-12.
Results for year ended December 31st, 1954: 135,359 passengers; 661,000 freight ton-km and 196,000 mail ton-km flown; total ton-km 4,787,000; other details not available.

Primeras Lineas Uruguayas de Navegacion Aerea—PLUNA, began operations as a private company in 1936 but in 1943 it was reorganized, with the Government taking a 49 per cent interest. The Government share later rose to 83 per cent and subsequently 94 per cent, before becoming completely Government-owned in 1951. Pluna operates domestic services and routes to the Argentine, Bolivia, Brazil and Paraguay.
Head Office: Montevideo, Uruguay.
Executives: Gen. P. Sicco, president; D. D. Cibils, general manager; R. Langon, operations manager; M. Artagaveytia, traffic manager.
Fleet: Five DC-3, four Heron.
Traffic statistics not available.

Provincetown - Boston Airline operates feeder services between Provincetown Municipal Airport and Logan Airport, Boston.
Head Office: Provincetown, Mass., U.S.A.
Executives: J. C. van Arsdale, president/treasurer.
Fleet: Lockheed Electra and Cessna.

"Q" Airways—see Aerovias "Q," S.A.

Qantas Empire Airways, Ltd., was founded in January 1934 by Q.A.N.T.A.S. and Imperial Airways for the operation of the Singapore - Brisbane section of the England - Australia air route then about to be established. Q.A.N.T.A.S. (Queensland and Northern Territory Aerial Services) was founded on November 16th,

Sir Hudson Fysh, K.B.E., D.F.C., chairman of Qantas Empire Airways.

1920, and on November 2nd, 1922, the company opened its first service between Charleville and Cloncurry. This was the first air service in eastern Australia and it was operated by Armstrong Whitworth FK.8 biplanes. Qantas now operates a network of routes in the south-west Pacific and New Guinea areas; to Europe; to the Philippines, Hong Kong and Tokyo; across the Indian Ocean to South Africa; and, since taking over B.C.P.A. in 1954, a trans-Pacific route to Honolulu, San

One of Riddle Airlines' cargo carrying Curtiss C-46s.

A Martin 2-0-2 of Southwest Airways.

WORLD AIRLINE DIRECTORY . . .

Francisco and Vancouver, British Columbia.
Head Office: Sydney, N.S.W., Australia.
Executives: Sir Hudson Fysh, chairman; C. O. Turner, chief executive/general manager; Capt. G. U. Allan, asst. general manager; Capt. R. J. Ritchie, technical manager; C. W. Nielson, commercial manager; F. C. Derham, finance manager/secretary.
Fleet: 12 L-1049, eight DC-4 (two chartered to Guest Aerovias), eight DC-3, four Beaver, one Drover, two Canso; on order, two L-1049H (late 1956).
Results for year ended December 31st, 1955: 113,121 passengers; 2,821 tons of freight and 1,292 tons of mail carried; 53,483,605 ton-miles flown; 5,535 staff. Financial details not available.

Quebecair, Inc., was incorporated in 1947 as Rimouski Airlines, Ltd., and took its present name in 1953. Services are operated across and on either side of the St. Lawrence from Quebec in the west to Port Menier and Gaspe in the east.
Head Office: Rimouski, P.Q., Canada.
Executives: A. Dionne, president; C. Delisle, operations manager.
Fleet: two DC-4, six DC-3, three Canso, three Beaver, one Beech 18.
In 1953 the company carried 68,800 passengers and 670 tons of freight.

Queensland Airlines Pty., Ltd. was the name taken by Aircrafts Pty., Ltd., in 1947 when Butler Air Transport acquired control of the company by purchasing 93 per cent of the outstanding stock. Working under its separate identity, Queensland Airlines has a network of services in Queensland and south to Sydney, N.S.W. It was the first company to announce an order for Handley Page Heralds.
Head Office: Brisbane, Queensland, Australia.
Executives: R. S. Adair, managing director; D. C. McDonough, traffic manager; M. B. Mitchell, operations manager.
Fleet: DC-3; on order, H.P. Herald (1957).
Results for year ended December 31st, 1955: 59,805 passengers; 1,250 tons of freight carried. Other details not available.

RANSA—see Rutas Aereas Nacionales, S.A.

REAL, S.A., Transportes Aereos, was founded in 1946 and is now one of Brazil's largest airlines. Apart from operating its own domestic network it controls Empresa de Transportes Aerovias Brasil (Brazilian International Airlines) and Aeronorte. It is understood that REAL has plans for the operation of trans-Pacific services to Japan.
Head Office: Sao Paulo, Brazil.
Executives: Capt. L. Gomes, president; Capt. A. Flemming, operations manager.
Fleet: eight Convair 340, about 30 DC-3, C-46.
Traffic statistics not available.

Reeve Aleutian Airways, Inc. This concern was founded in 1932 but operated mainly charter services until 1948 when the C.A.B. granted the company a certificate of public convenience and necessity. Services are operated from Anchorage through the Aleutians to Attu and the company is authorized to fly on an irregular basis between any of its certificated points and the Pribilof Islands.
Head Office: Anchorage, Alaska.
Executives: R. C. Reeve, president; Margaret Rutledge, secretary.
Fleet: three DC-3, two Sikorsky S-43, one Goose, two Fairchild 71, one Boeing 80A.
In 1953 the company carried 3,500 passengers and flew a total of 654,000 revenue ton-miles.

Régie Aèrienne Interinsulaire began services in 1951, linking points in the Society Islands, some of which were previously served by Air Tahiti and T.R.A.P.A.S. Points served, apart from Papeete in Tahiti, are Huahine, Raiatea and Bora Bora.
Head Office: Papeete, Tahiti.
Executives: Chief of the Service of Public Works and Mines; Agent of Messageries Maritimes.
Fleet: one Catalina; on order, one Catalina (April 1956).
Results for year ended December 31st, 1955: 3,317 passengers; 12 tons of freight and one ton of mail carried; 10 staff. Other details not available.

Riddle Airlines, Inc. began cargo operations between New York and Puerto Rico in 1947, and in 1951 became a certificated all-cargo carrier with a route linking New York and various cities in Puerto Rico *via* Miami. Considerable textile traffic has been built up, with material being flown south for finishing, after which it is flown north for retail.
A current U.S. Air Force contract worth $2½m is employing eight C-46s flying cargo between air force bases in six Western states. Applications have been filed for a considerable extension of the airline's scheduled services.
Head Office: Miami, Florida, U.S.A.
Executives: J. P. Riddle, president; P. T. Craven, executive vice-president/treasurer; Jane B. Ramsey, secretary; C. L. Hood, vice-president sales.
Fleet: 16 Curtiss C-46, four DC-4.
Results for year ended June 30th, 1955: 6,960 tons of freight carried (Jan.-Sept.); total costs, £985,628; total revenue, £1,171,179. Other details not available.

Rutas Aereas Nacionales, S.A.—RANSA, was founded as a private company in 1948. The company has C.A.B. authorization to carry passengers, mail and cargo between Venezuela and Miami *via* Netherlands West Indies and Jamaica, but at present only cargo services are operated.
Head Office: Caracas, Venezuela.
Executives: C. Chaves, president; E. Pardey, general manager; J. C. Cooper, traffic manager; R. D. Borges, operations manager.
Fleet: C-46s.
Traffic figures not available.

Rutas Aereas Sociedad Aeronautica Medellin, S.A., operates routes in the central and northern parts of Colombia serving Medellin, Bogota, Cali, Barronquilla, Santa Marta and other points.
Head Office: Medellin, Colombia.
Executives: Names not available.
Fleet: DC-4, DC-3.
Traffic statistics not available.

Sabena Belgian World Airlines (Société Anonyme Belge d'Exploitation de la Navigation Aérienne) was founded in 1923 as successor to S.N.E.T.A. Sabena developed a

Gilbert Périer, the chairman of Sabena.

Two of Sabena's Sikorsky S-55s at Brussels Heliport.

European network and later routes to and in the Belgian Congo. The airline now has an extensive route-pattern in Europe, to the Middle East, to Africa, within the Belgian Congo and to North America.
Sabena is the only operator of international helicopter services. Following several years of helicopter mail operation within Belgium, the company began passenger services to Holland and France on September 1st, 1953, and its S-55s now fly from Brussels to Lille, Antwerp, Rotterdam, Eindhoven, Liège, Maastricht,

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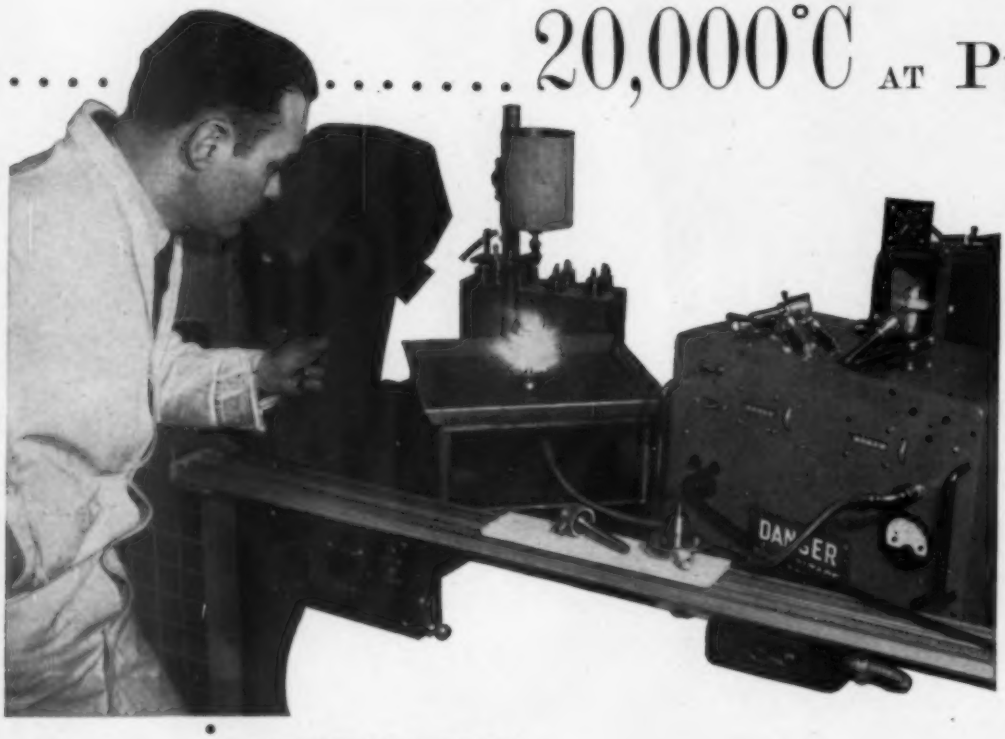

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WORLD AIRLINE DIRECTORY . . .

Cologne and Bonn. A helicopter service between Brussels and Paris is due to open this year.
Head Office: Brussels, Belgium.
Executives: G. Périer, chairman; G. Claeys, managing director; W. Deswarte, general manager; A. Vernieuwe, vice-president; R. Golstein, general secretary; F. Pirson, technical manager; G. Dieu, manager Africa.
Fleet: two DC-6C, eight DC-6B, four DC-6, eight DC-4, 29 DC-3, five Convair 240, six Sikorsky S-55; on order, nine DC-7C (November 1956), 12 Convair 440 (Spring 1956), four Boeing 707-320 (end of 1959), eight S-58 (Spring 1956).
Results for year ended December 31st, 1955: 449,698 passengers; 94,897,874 ton-km flown; 8,074 staff. Other details not available.

S.A. Empresa de Viação Aérea Rio Grandense, "VARIG," was founded in 1927, with the technical assistance of the German Condor Syndicat, for the operation of local services. The company now has an extensive route system in Brazil and also operates services to New York, Montevideo and Buenos Aires. In 1951 Varig took over Aero Geral, which was operating about 1,500 miles of domestic services. More than 80 per cent of Varig's capital is held by company employees, either privately or through the Foundation of Varig Employees. There is a small government holding.
Head Office: Porto Alegre, Brazil.
Executives: R. M. Berta, president; G. G. Herzfeldt, operations director; R. Schaly, director of traffic; H. Beaumel, director of maintenance; L. Zerwes, chief accountant.
Fleet: three L-1049G, five Convair 240, 14 Curtiss C-46, 23 DC-3.
Results for year ended December 31st, 1955: 425,175 passengers; 18,607 tons of freight and 270 tons of mail carried; 50,030,305 ton-km flown; total costs £10,705,882; total revenue £12,333,333.

S.A.F.E.—see Braathens South American and Far East Airtransport A/S.

SAHSA—see Servicio Aereo de Honduras, S.A.

S.A.S.—see Scandinavian Airlines System.

Saskatchewan Government Airways was founded in 1947 by the provincial Government to take over the M. and C. Aviation Co. and to operate services to North Saskatchewan. The airline operates about 1,400 miles of routes northward from Prince Albert and serves places with such delightful names as Uranium City, Goldfields, Stony Rapids, Buffalo Narrows, Snake Lake, Pelican Narrows and Flin Flon. S.G.A. also leases aircraft to the Air Ambulance Service and the Forest Fire Control Branch of the Department of Natural Resources.
Head Office: Prince Albert, Sask., Canada.
Executives: I. Macleod, general manager; F. R. Baudais, operations manager; J. A. Pool, chief engineer.
Fleet: one DC-3, one Anson 5, four Norseman, four Beaver, four Cessna 140, three Cessna 180, one D.H.82, one Stinson 108.
In 1954 about 11,000 passengers and 1,500 tons of freight and mail were carried. About 90 staff.

SATA—see Sociedade Açorianá de Transportes Aéreos, Ltda.

Saudi Arabian Airlines was founded in 1946 by the Government and is managed by T.W.A. The airline began operations in 1947 and now has about 4,500 miles of routes within Saudi Arabia and to Egypt, the Lebanon, Sudan and Syria. Considerable pilgrim traffic is carried.
Head Office: Jedda, Saudi Arabia.
Executives: W. E. Blankenship, technical manager; S. H. Wheatley, supt. flight operations.
Fleet: Convair 340, DC-4, DC-3, Bristol 170. Traffic statistics not available.

SAVAG—see Sociedade Anonima Viacao Aerea Gaucha

Scandinavian Airlines System is a consortium of Swedish Air Lines (A.B.A.), Danish Air Lines (D.D.L.) and Norwegian Air Lines (D.N.L.) to the proportions 3, 2 and 2. S.A.S. originally came into being, in 1946, for the operation of transatlantic services, and both North and South Atlantic routes were opened in that year. All routes of the three airlines are now operated by S.A.S. with the original airlines acting as holding companies.
S.A.S. maintains Scandinavian internal services, a European network, and routes to South Africa, the Middle and Far East, and to North and South America. In 1954 a northern route between Scandinavia and the west coast of the U.S.A. was opened, and a trans-Polar route to the Far East is projected. Following a charter flight to Australia, later this year, S.A.S. expects to make a survey flight over the Antarctic continent.
Head Office: Stockholm, Sweden.
Executives: H. Throne-Holst, president; S. Ostling, V. J. Rasmussen, T. A. Boye, N. Langhelle, executive vice-presidents; K. Hagerup-Svendsen, vice-president operations.
Fleet: 14 DC-6B, 12 DC-6, four DC-4, 10 DC-3, eight Scandia, one Ju52/3mW; on order, seven DC-8 (1959/60), 14 DC-7C (1956/57), 11 Convair 440 (April-September 1956).
Results for year ended December 31st, 1955: 972,995 passengers; 10,970 tons of freight and 4,464 tons of mail carried; 127,591,000 ton-km flown; total revenue, £21,984,550; 8,000 staff.

Scheduled Skyways System operates three services a day between Fayetteville and Little Rock.
Head Office: Fayetteville, Arkansas, U.S.A.
Fleet: Cessna 170, Cessna 195, Beech Bonanza.

Seaboard and Western Airlines, Inc., is a well established non-scheduled cargo carrier which has long sought approval for the operation of scheduled transatlantic cargo services. Approval has now been given and a five times weekly service was begun on April 10th. New York, Philadelphia and Baltimore are served in the U.S.A., and Shannon, London, Brussels, Amsterdam, Hamburg, Düsseldorf, Frankfurt, Nuremberg, Stuttgart, Munich, Paris, Geneva and Zürich in Europe. Seaboard has interline agreements with 29 U.S. and foreign scheduled airlines.
Head Office: New York, U.S.A.
Executives: R. A. Norden, president; A. V. Norden, executive vice-president/treasurer; C. D. Brell, vice-president operations; W. P. Neth, vice-president traffic/secretary.
Fleet: five L-1049, five DC-4; on order, five L-1049H.
The company flew 15,328,000 freight ton-miles last year.

Servicio Aereo de Honduras, S.A.—SAHSA, was founded in 1945 by Honduran private interests and Pan American Airways. Operations were begun in October 1945. The company operates a network of routes in Honduras and a route between San Pedro and Belize in British Honduras. In 1953 SAHSA acquired all the stock of TACA de Honduras but the latter concern continues to operate as a separate company.
Head Office: Tegucigalpa, Honduras.
Executives: C. Izaguirre, president; J. B. Saidla, operations manager; F. Lardizabel, treasurer; H. Coello, secretary.
Fleet: DC-3.
Traffic statistics not available.

Serviço de Transportes Aéreos. Little is known about this company but it is believed to be operating regular services between the islands of Sao Tomé and Principe off the west coast of Africa.
Head Office: Sao Tomé, Province of Sao Tomé and Principe, Portuguese West Africa.
Executive: V. C. Cortes, chief executive.
Fleet: three D.H.89, one Tiger Moth, one Piper Super Cruiser, one Autocar.
Results for year ended December 31st, 1955: 846 passengers; 2.6 tons of freight and 0.8 tons of mail carried; 10,174 ton-km flown; 26 staff. Other details not available.

Serviços Aéreos Cruzeiro do Sul Ltda—Cruzeiro. This airline's history goes back to December 1927 when Syndicato Condor Ltda was founded by German interests. A coastal route was established from Belem through Rio de Janeiro and on to Buenos Aires and across the Andes to Santiago in Chile. From Natal south this formed part of the German route to South America opened in 1934. Dornier Wal, Junkers F13 and W34s were used by Condor and later Ju 52s and Focke Wulf Condors came into service. In 1942 the company was reorganized, cleared of German control and given its present name. The company now operates more than 12,000 miles of routes in Brazil and between Brazil and neighbouring countries.
Head Office: Rio de Janeiro, Brazil.
Executives: Dr. J. B. R. Dantas, president; J. Q. V. de Carvalho, commercial director; Col. F. A. Rocha, operations director.
Fleet: 35 DC-3, four Convair 340, four Beech AT-11.
Results for year ended December 31st, 1954: 387,875 passengers; 6,108,000 freight ton-km and 197,000 mail ton-km flown; total ton-km 25,640,000; 3,567 staff.
Financial details not available.

Slick Airways, Inc., is one of the largest U.S. scheduled cargo carriers. Its services include transcontinental operations from Boston and New York to Los Angeles and most flights serve Chicago. A very high percentage of the company's flying is done at night in order to provide overnight delivery services. Slick was founded in 1946 and began operation as a contract cargo carrier. Scheduled services were authorized in 1949. Slick and the Flying Tiger Line attempted a merger in 1954 but financial demands by labour made the merger financially impossible. [*Contd. overleaf.*]

WORLD AIRLINE DIRECTORY . . .

Head Office: Burbank, Cal., U.S.A.
Executives: D. W. Rentzel, chairman/president; E. F. Slick, chmn., exec. cttee. (portrait, p.484), H. P. Huff, vice-president operations and maintenance; J. W. Walbert, secretary; H. J. Ruppel, treasurer.
Fleet: 17 Curtiss C-46, three DC-6A, three DC-4; on order, three DC-6A (1956-57).
Results for year ended December 31st, 1955: 10,240 passengers (non-scheduled); 27,519 tons of freight and mail carried (total); 55,977,066 ton-miles flown (total); total costs £4,821,428; total revenue £4,464,285; 1,505 staff.

Sobelair, Société Belge de Transports par Air, S.A., began operations between Belgium and the Congo soon after the war as an independent airline, and the company still operates between these points. The managing director of Sabena is Sobelair's chairman.
Head Office: Brussels, Belgium.
Executives: G. Claeys, chairman/managing director; A. Philippe, general manager; P. Bertin, commercial manager; J. Carlier, operations manager.
Fleet: one DC-4, one DC-3; on order, one DC-4 (April 1956).
Results for year ended December 31st, 1955: 4,100 passengers; 40.5 tons of freight carried; 3,205,373 ton-km flown; 45 staff. Financial details not available.

Sociedade Açoriana de Transportes Aéreos, Ltda.—SATA. This company began operations in 1948 and now has 313 miles of routes. Six services a week are operated between Sao Miguel and Santa Maria and three of these continue to Terceira after calling at Sao Miguel.
Head Office: Sao Miguel, Azores.
Executives: A. M. S. Noqueira, general manager; J. A. Neves, chief engineer; V. A. Portugal, traffic manager.
Fleet: two Dove, one D.H.82.
In 1953 SATA carried 4,400 passengers and flew 48,500 revenue ton-miles.

Sociedade Anonima Viacao Aerea Gaucha—SAVAG. Founded in 1946 as a private company to operate services in the State of Rio Grande, the original fleet consisted of three Lodestars. Present routes are from Rio Grande to Porto Alegre *via* Pelotas and from Porto Alegre to Bage, and to Erechim *via* Carasinho and Passo Fundo. Cruzeiro do Sul supplies SAVAG with crews and provides maintenance, technical assistance and also handles reservations.
Head Office: Rio Grande do Sul, Brazil.
Executives: E. C. Becker, president; V. V. de Fonseca, vice-president; T. Fruet, operations manager.
Fleet: DC-3.
Traffic statistics not available.

Sokao (Soviet-North Korean Airline) was founded in 1950 as a joint Soviet-North Korean concern to connect North Korea with the Aeroflot services to Moscow. Services were suspended when the North Koreans invaded South Korea and only resumed in 1953. Sokao now flies four services a week from Feng-Yang to Chita in the U.S.S.R. *via* Mukden and Harbin. In addition there are four weekly services between Feng-Yang and Mukden.
Head Office: Feng-Yang, North Korea.
Fleet: Li-2.

South African Airways was formed in 1934 to take over Union Airways, and the airline is owned and controlled by the Government through the South African Railways and Harbours Administration. In 1935 the new airline acquired South West African Airways. SAA now operates an internal network of routes and also has services to Rhodesia and *via* Cairo to London.
Head Office: Johannesburg, Transvaal, Union of South Africa.
Executives: Maj-Gen. C. J. Venter, airways manager; J. D. T. Louw, commercial superintendent.
Fleet: three DC-7B, four L-749A, seven DC-4, four DC-3.
In 1954 SAA carried 218,000 passengers and 2,700 tons of freight and mail.

Southern Airlines, Ltd., was founded in April 1955 and operates services from Melbourne to Sale, Bairnsdale, Shepparton, Benalla, Warrnambool, Echuca and Balranald. Free insurance is provided for all passengers with signed valid tickets.
Head Office: Melbourne, Victoria, Australia.
Fleet: Dove, Anson.

Southern Airways, Inc., was founded in July 1943 and began operations in June 1949. About 2,500 miles of routes are operated in Georgia, Alabama, Mississippi, Louisiana, Tennessee, Florida and North and South Carolina.
Head Office: Birmingham, Alabama, U.S.A.
Executives: F. W. Hulse, president; C. M. Britt, vice-president sales; W. S. MaGill, vice-president operations; G. Estey, secretary/treasurer.
Fleet: 12 DC-3.
Results for year ended December 31st, 1955: 168,993 passengers; 530 tons of mail carried; 3,118,535 ton-miles flown; total costs £1,240,722; total revenue £1,274,032; 435 staff.

South West Air Transport (Pty.), Ltd., has for several years been operating feeder services connecting with South African Airways' flights at Windhoek. The present operations include three weekly services between Windhoek and Otjiwarongo, Outjo, Tsumeb and Grootfontein.
Head Office: Windhoek, South West Africa.
Executive: P. H. M. Du Plessis, chairman; G. T. van Rooyen, manager; A. K. L. Finke, chief engineer.
Fleet: six Ryan Navion, one D.H.89.
Results for year ended December 31st, 1955: 2,500 passengers carried; 11 staff. Other details not available.

Southwest Airways Company was founded in 1941 and began airline operation at the end of 1946 when it opened its San Francisco - Los Angeles route. The company now has 1,300 miles of routes all within California, except for its services to Medford in the south of Oregon. Southwest was a pioneer of the quick turn-round at intermediate points with stops of only one to two minutes. At refuelling stops the turn-round time is six minutes. The company is reported to be negotiating with Fairchild for the purchase of some Fokker Friendships.
Head Office: San Francisco, Cal., U.S.A.
Executives: L. Hayward, chairman; J. H. Connelly, president/general manager; T. R. Mitchell, executive vice-president; A. W. Johnson, vice-president/treasurer; R. E. Costello, vice-president traffic and sales.
Fleet: 10 DC-3, five Martin 2-0-2; on order, one Martin 2-0-2 (1956).
Results for year ended December 31st, 1955: 236,083 passengers; 1,277.3 tons of freight and 606.5 tons of mail carried; 5,255,865 ton-miles flown; total costs £1,452,676; total revenue £1,516,422; 390 staff.

Sudan Airways is government-owned and began operations in 1947. Routes extend throughout the Sudan from Wadi Halfa in the north to Juba in the south; and from Geneina in the west to Port Sudan in the east. International routes serve Jeddah, Cairo, Beirut; and Abeche in French Equatorial Africa.
Head Office: Khartoum, Sudan.
Executives: A. B. Mohd, general manager (portrait, p.484); Y. Bakheit, traffic supt. (admin.); M. H. A. Bashendi, traffic superintendent (technical); M. El Amir, sales superintendent; C. E. Blake, chief accountant; Capt. R. L. C. Branson, chief pilot; A. C. Watts, chief engineer; H. Ahmed, operations superintendent.
Fleet: four DC-3, four Dove; on order, one DC-3 (1956).
Results for year ended December 31st, 1955: 25,296 passengers; 380 tons of freight and 40 tons of mail carried; 1,302,697 ton-miles flown; 492 staff. Total costs (July 1954-June 1955) £466,083 approx.; total revenue (July 1954-June 1955) £453,554 approx.

Swissair—Swiss Air Transport Co., Ltd., was founded on March 26th, 1931, by the amalgamation of Ad Astra Aero A.G. and the Basle Air Traffic Co., known as Balair. Ad Astra was founded in 1919 and began flying-boat services linking Swiss cities, before pioneering international routes. Thus Swissair can claim, with its predecessors, 36 years of continuous operation, although its activities were severely restricted during the war. Since the war the company has grown rapidly and it now operates a network of European routes, and has services to North and South America and the Near East.

Swissair has always pioneered the use of modern equipment, first with Lockheed Orions and later with DC-2s and DC-3s. Continuing this tradition, Swissair has now placed an order for two DC-8s.
Head Office: Zürich, Switzerland.
Executives: Dr. W. Berchtold, president; E. Groh, vice-president finance; L. L. Ambord, vice-president traffic and sales; R. Fretz, vice-president operations.
Fleet: six DC-6B, seven Convair 240, three DC-4, nine DC-3; on order, eight Convair 440 (1956), four DC-7C (1956/57), two DC-8 (1960).
Results for year ended December 31st, 1955: 630,719 passengers; 8,486.8 tons of freight and 3,317.2 tons of mail carried; 95,193,537 ton-km flown; 3,223 staff. Financial details not available.

Syrian Airways Company was formed in 1946 and began operations in 1947. Financial difficulties caused the suspension of services in 1948, but after receiving Government support operations were resumed in 1951. The com-

A Douglas DC-7 of United Air Lines.

Dr. W. Berchtold, president, Swissair.

pany now flies domestic services and also has international routes to Jordan, the Lebanon, Egypt, Saudi Arabia, Iraq and Kuwait.
Head Office: Damascus, Syria.
Executive: N. Baker, general manager.
Fleet: DC-3.
Traffic statistics not available.

T.A.A.—see Trans-Australia Airlines.

TABSO—Bulgarian Civil Air Transport, operates domestic services and routes to Belgrade, Budapest, Prague and Berlin. The airline came into being after the war as the Government's Bulgarske Vazdusne Sobstenie and in 1949 it became TABSO, in which Bulgaria and the U.S.S.R. each held 50 per cent. The U.S.S.R. withdrew its interest in 1954.
Head Office: Sofia, Bulgaria.
Fleet: Li-2.

TACA de Honduras, now a subsidiary of SAHSA, began charter operations in 1931 and became part of the TACA System in 1932. Scheduled services were begun in 1944. The TACA System sold its interests in the company in 1948. The company operates a domestic network of services.
Head Office: Tegucigalpa, Honduras.
Executives: A. Rodriguez, president; W. A. Buxbaum, treasurer; C. A. Garcia, secretary.
Fleet: DC-3.
Traffic statistics not available.

TACA International Airlines S.A. was founded in Salvador in 1939 as a subsidiary of the U.S. TACA Corporation. Although TACA once controlled a number of airlines, TACA International is now the only one still operated by the Corporation. Routes extend from New Orleans and Mexico City through Guatemala, San Salvador, Tegucigalpa and Managua to San Jose, in Costa Rica, and Panama.
Head Office: New Orleans, Louisiana, U.S.A. (operating from San Salvador).
Executives: R. H. Kreite, president; R. E. Clipson, vice-president operations; J. D. Brook, vice-president traffic.
Fleet: DC-4.
Traffic statistics not available.

T.A.E.—see National Greek Airlines.

T.A.I.—see Compagnie de Transports Aériens Intercontinentaux.

TAN Airlines—see Transportes Aereos Nacionales, S.A.

TAP—see Transportes Aéreos Portugueses.

TAROM—see Transporturi Aeriene Romine.

TAS—see Transportes Aereos Salvador, Ltda.

Tasman Empire Airways, Ltd., was formed in 1940 as a joint British - Australian - New Zealand company for the operation of services linking New Zealand and Australia. Operating Short C-class flying-boats, it maintained during the war the only regular passenger service of any kind between the two countries. In 1954 Britain withdrew and Teal is now owned jointly by the New Zealand and Australian Governments.

DC-6s replaced flying-boats on the trans-Tasman and Fiji services in 1954, but Solents are used on the Coral Route from Fiji to Tahiti *via* Samoa and Cook Islands. The company has over 8,000 miles of routes in operation.
Head Office: Auckland, New Zealand.
Executives: Sir Leonard Isitt, chairman; G. N. Roberts, general manager; J. W. Veale, asst. general manager; F. A. Reeves, commercial manager; K. A. Brownjohn, operations manager; D. W. Banks, chief accountant.
Fleet: three DC-6; two Solent.
Results for year ended March 31st, 1955: 43,644 passengers; 338 tons of freight and 358 tons of mail carried; 511,049 ton-miles flown; total costs, £1,780,806; total revenue, £1,862,359; 660 staff.

T.C.A.—see Trans-Canada Air Lines.

TEAL—see Tasman Empire Airways, Ltd.

Thai Airways Company, Ltd.—TAC, was formed in 1951 by the merger of Siamese Airways Co., Ltd., and Pacific Overseas Airlines (Siam), Ltd. The Government is believed to hold almost the entire stock. Thai Airways maintains domestic services and also operates to Calcutta, Rangoon, Hong Kong, Formosa, Tokyo, Vientiane, Saigon, Penang and Singapore. It has been reported that TAC has ordered two Super Constellations but at present all scheduled services are flown with DC-3s and DC-4s.
Head Office: Bangkok, Siam.
Executives: not available.
Fleet: two DC-4, five DC-3, Norseman; on order, two L-1049 (it is not certain whether this order still stands).
In 1954 TAC carried nearly 50,000 passengers and more than 1,000 tons of freight and mail.

Trans-Air, Ltd., was formed recently by the amalgamation of Central Northern Airways and Arctic Wings. Central Northern Airways was formed in 1947 to acquire and operate some bush routes formerly operated, in Saskatchewan, Manitoba and Ontario, by Canadian Pacific Air Lines. Arctic Wings, based at Churchill on Hudson Bay, had been operating scheduled passenger and mail flights north to Baker Lake and south to Fort Severn. Charter flights and occasional mail services extended to the far north and served Arctic Bay and Pond Inlet on Baffin Island.
Head Office: Winnipeg, Manitoba, Canada.
Executives: not available.
Fleet: five Norseman, two Canso, one Lockheed 12A, two Anson 5.

Transair Sweden A.B. Details of the company's present operations are not available, but in addition to charter flying and the operation of inclusive tours, Transair Sweden has operated scheduled services on behalf of S.A.S., including some between Stockholm and Visby.
Head Office: Stockholm, Sweden.
Executives: P. Lovén, managing director.
Fleet: three DC-3, two Consul; on order, one DC-3 (1956).
Results for year ended December 31st, 1955: 27,375 passengers; 1,622 tons of freight and 2.5 tons of mail carried; 362,836 ton-km flown. Other figures not available.

Wideroe's de Havilland Otter which operates services in northern Norway.

Trans-Australia Airlines was set up, and is controlled on behalf of the State, by the Australian National Airlines Commission, for the operation of domestic services. Operations began in 1946 and have been extremely successful; its present route mileage of more than 27,000 makes it the largest domestic airline in the Commonwealth.

A network of routes link Melbourne, Adelaide, Sydney, Brisbane and Hobart. A coastal route serves Townsville and Cairns; there are routes from both Adelaide and Brisbane to Darwin and one from Adelaide to Perth. T.A.A. was the first Australian airline to operate Viscounts.
Head Office: Melbourne, Victoria, Australia.
Executives: G. P. N. Watt, chairman; S. N. Crawford, secretary; J. P. Ryland, gen. mgr. (portrait, p.483); R. E. Bailey, acting dir., operations; J. Borthwick, commercial director; H. L. Brown, chief accountant.
Fleet: six Viscount, five Convair 240, four DC-4, 22 DC-3, four Drover, one D.H.84; on order, five Viscount (1956/57).
Results for year ended December 31st, 1955: 739,783 passengers; 18,485 tons of freight and 1,720 tons of mail carried; 9,847,175 freight ton-miles flown; total costs, £8,558,901; total revenue, £8,779,960; 3,534 staff. Financial results are for year ended June 30th, 1955.

A Trans-Australia Airlines' Viscount taxying past the Comet 3 at Melbourne.

An Air Vietnam Bristol 170 Mk 31, seen here at Filton before its delivery flight.

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Trans-Canada Air Lines was founded in 1937 as the nationally-owned airline, with the stock being held by the Government Canadian National Railways. The company began operations between Vancouver and Seattle and established air mail services between Montreal and Vancouver by October 1938 and transcontinental passenger services by April 1939. In May 1947, T.C.A. took over commercial operation of its wartime-established transatlantic services to Britain.

The airline now operates transcontinental services, services to Europe, the U.S.A., Bermuda, Jamaica, the Bahamas and Trinidad. The

G. R. McGregor, president of Trans-Canada Air Lines.

company has also recently taken over the routes of C.P.A. in Quebec Province. T.C.A. was the first airline to introduce Viscount services in North America.
Head Office: Montreal, Canada.
Executives: G. R. McGregor, president; W. F. English, vice-president operations; W. G. Wood, vice-president sales; R. H. Tarr, secretary; G. S. Cowie, treasurer.
Fleet: seven L-1049, 22 Canadair North Star, 15 Viscount, 26 DC-3; on order, two L-1049 (1956), 21 Viscount.
Estimated results for year ended December 31st, 1955: 1,680,000 passengers; 9,835,000 freight ton-miles and 7,610,000 mail ton-miles flown; total revenue, £26,936,871; 8,550 staff.

Trans Mar de Cortés was founded as a private company in 1947 and began operations in December 1948 with freight and mail services. Passenger carriage began in 1949 and in July 1952 the company took over Lineas Aereos del Pacifico. A network of routes is operated in the Gulf of California area.
Head Office: Guaymas, Sonora, Mexico.
Executives: M. Obregon, director/manager; L. Coppola, general manager.
Fleet: three or more DC-3.
Results for year ended December 31st, 1954 (approximate): 18,000 passengers; 1,000,000 freight and mail ton-miles flown; 114 staff.

Transocean Air Lines (Trust Territory Operations). The Trust Territory of the Pacific Islands includes the Carolines, the Marshall Islands and the Marianas. Some of the main islands in these groups were occupied under mandate by the Japanese until they were driven out during the war. The Trust Territory was then set up by United Nations with the U.S.A. as trustee. Transocean Air Lines was awarded a contract to provide air communication and emergency services in the area, and began passenger, mail and freight operations there in June 1951 with Cansos. Albatross amphibians now fly from Guam to Yap, Koror, Ponape and Majuro.
Head Office (Trust Territory Ops.): Guam, Marianas Islands.
Fleet: two Grumman Albatross, Canso.
Traffic statistics not available.

Transpac is a new company based at Noumea in New Caledonia, and which has just begun the operation of local scheduled services.
Fleet: D.H.89.

Trans-Pacific Airlines, Ltd. (TPA Aloha Airline), was founded in June 1946 and began non-scheduled passenger and cargo services on July 26th that year. A certificate for scheduled operation was applied for in 1946 and TPA worked as a common carrier until restrained in September 1947. The C.A.B. authorized scheduled services to eight cities on six islands in 1948, the President of the United States approved in February 1949 and regular scheduled services began in June 1949. TPA's routes are essentially similar to those operated by the long established Hawaiian Airlines.
Head Office: Honolulu, Hawaii.
Executives: R. F. Tongg, president; R. H. King, vice-president traffic; O. V. Andrew, operations manager.
Fleet: six DC-3.
Results for year ended December 31st, 1954: 173,500 passengers; 835 tons of freight and mail carried; 124,000 freight and mail ton-miles flown; 220 staff.
Financial details not available.

Transportes Aériens du Gabon, began regular operations in 1951 and now links a score of places with Libreville.
Head Office: Libreville, Gabon, Fr. Equatorial Africa.
Fleet: four D.H.89, four Cessna 170B, two Autocrat, one Proctor 5.
In 1953 the company carried 1,700 passengers.

Transportes Aereos da India Portuguesa is a newly formed company, which it is believed intends to operate services between Goa and other points including Aden. It is not known whether this company is connected with Servicos de Transportes Aereos de India, which is thought to be operating two Herons on a route linking Goa and Karachi.
Fleet: two Viking.

Transportes Aereos Catarinense, S.A., operates coastal routes north from Florianopolis to Rio de Janeiro and south from Florianopolis to Porto Alegre. Cruzeiro do Sul provides TAC with crews and technical assistance.
Head Office: Florianopolis, Brazil.
Executives: Dr. J. D. F. Lima, president; L. F. Lima, vice-president/secretary; E. Neves, operations manager.
Fleet: DC-3.
Traffic statistics not available.

Transportes Aereos Nacionales, S.A.—TAN Airlines was founded by Honduran private interests in 1947 for the operation of contract cargo flights. The company built up substantial cargo traffic and in 1950 scheduled passenger and freight operations were begun. There is now a small U.S. private holding in the company. TAN's routes now serve Miami, Cuba, El Salvador, Nicaragua, Ecuador and Peru, in addition to Honduras.
Head Office: Tegucigalpa, Honduras.
Executives: M. Brooks, president; D. Caseo, secretary.
Fleet: DC-3.
Traffic statistics not available.

Transportes Aéreos Portugueses, S.A.R.L.—TAP, was organized in 1944 as a division of the Civil Aviation Department. Its first route, between Lisbon and Madrid, was opened in September 1946. Services to Angola and Moçambique were opened in the following year. A large part of the stock of TAP is now privately owned. The company operates services between Lisbon and Oporto and international services to Tangier, Casablanca, Paris, Madrid, London, Luanda and Lourenço Marques. Schedules have been published for a new route from Lisbon to Recife and Rio de Janeiro.
Head Office: Lisbon, Portugal.
Executives: D. F. de Mello e Castro, chairman; E. Coelho, executive general secretary; H. Costa, commercial manager; R. de Avelar, operations superintendent; J. C. Ferreira, maintenance superintendent.
Fleet: six DC-3, three DC-4, three L-1049G.
Results for year ended December 31st, 1955: 33,105 passengers; 123 tons of freight and 145 tons of mail carried; 5,109,942 ton-miles flown; total costs £1,386,840; total revenue £1,146,830; 742 staff.

Transportes Aereos Salvador, Ltda., was founded as a charter operator in 1949 and began scheduled operations within the State of

Andrew B. Shea, president, Panagra.

D. Tomás Delgado, chairman, Iberia.

C. E. Woolman, president, Delta Air Lines.

Donald W. Nyrop, president, Northwest Airlines.

Robert F. Six, pres., Continental Air Lines.

George Gardner, president, Northeast Airlines.

Sir Leonard Isitt, K.B.E., chmn., Tasman Empire Airways.

Capt. I. N. Holyman, managing director, A.N.A.

J. R. D. Tata, chairman, Air-India Intnl.

J. P. Ryland, general manager, T.A.A.

Bahia in 1953. A network of local services is now being operated, although various difficulties brought about the suspension of operations during part of 1953. The company is believed to receive some State subsidy.
Head Office: Salvador, Bahia, Brazil.
Executives: C. P. Horta, general manager; J. F. P. Horta, technical manager.
Fleet: Heron, Beech Bonanza.
Traffic statistics not available.

Transporturi Aeriene Romine—TAROM (Rumanian Air Lines) is the Rumanian State airline which in 1954 succeeded the joint Soviet - Rumanian TARS, which was formed in 1946. TAROM has about 2,000 miles of routes and operates services within Rumania and to Budapest, Prague and Berlin.
Head Office: Bucharest, Rumania.
Executives: V. M. Karotov, director general; M. Pavlovski, operations manager; D. Grigorash, technical manager.
Fleet: Li-2.
Traffic statistics not available.

Trans-Texas Airways was founded in 1944 as Aviation Enterprises and began scheduled operation in October 1947. The airline now has about 3,000 miles of routes within Texas and between that state and Louisiana, Tennessee and Arkansas.
Head Office: Houston, Texas, U.S.A.
Executives: R. E. McKaughan, president; H. E. Eromann, vice-president operations; L. J. Eichner, vice-president traffic and sales; M. L. Muse, secretary/treasurer.
Fleet: 16 DC-3.
Results for year ended December 31st, 1955: 157,659 passengers; 1,107 tons of freight and 769 tons of mail carried; 3,953,684 ton-miles flown; total costs, £1,648,645; total revenue, £1,736,554; 540 staff.

Trans World Airlines, Inc., claims its origin in Western Air Express, which was founded in 1925 to bid for an air mail route from Los Angeles to Salt Lake City. WAE began mail service in 1926. In 1929 Transcontinental Air Transport, which had inaugurated a combined rail-air transcontinental route, obtained control of Maddux Air Lines. At about the same time Western Air Express absorbed Standard Air Lines and then on October 1st, 1930, TAT-Maddux and Western Air Express completed a merger to form Transcontinental and Western Air, Inc. (TWA). In 1934, reconstitution followed the Post Office mail-flying upheaval, and it took its present title in 1950. TWA has been responsible for the production of some fine aircraft, having issued the specification for the Douglas DC-1/DC-2, the Stratoliner and the Constellation. TWA now has about 18,000 miles of routes stretching from coast-to-coast of the U.S.A.; across the North Atlantic to Europe, the Near and Middle East. The company still hopes to extend its system to Bangkok and Manila.
Head Office: New York, N.Y., U.S.A.
Executives: Warren Lee Pierson, chairman; J. A. Collings, executive vice-president; A. V. Leslie, vice-president finance and treasury; G. H. Clay, vice-president/secretary; J. H. Clemson, vice-president passenger service; E. O. Cocke, vice-president sales.
Fleet: 20 L-1049G, 10 other L-1049, 71 Constellation, 49 Martin 2-0-2A and 4-0-4, 11 DC-4, five DC-3; on order, eight L-1049G, 25 L-1649A, eight Boeing 707.
Results for year ended December 31st, 1955: 4,028,495 passengers; 38,020 tons of freight and 16,674 tons of mail carried; 64,661,000 ton-miles flown, 17,000 staff.
Financial details not available.

Warren Lee Pierson, the chairman of T.W.A.

Trust Territory Operations—see Transocean Air Lines.

Tunis Air was founded in 1948 by the Tunisian Government, Air France and other interests. It operates internal services and routes to Algeria, Libya, Corsica, France and Italy.
Head Office: Tunis, Tunisia.
Executives: P. F. Delaunay, general manager; G. Sartre, commercial manager; M. Gauthier, technical manager.
Fleet: one DC-4, four DC-3; on order, one DC-4 (spring 1956).
Results for year ended December 31st, 1955: 92,344 passengers; 498 tons of freight and 189 tons of mail carried; 4,829,927 ton-km flown; total costs, £550,000; total revenue, £620,000; 140 staff.

Türk Hava Yollari Anonim Ortakligi, formerly known as Devlet Hava Yollari (Turkish State Air Lines) was set up by the Government in 1933 as part of the Turkish Air Force. Control passed to the Ministry of Communications in 1939. Operations were confined to domestic services until 1949. The airline now operates an internal network of passenger services and a freight service between Istanbul and Ankara. International routes are to Nicosia and Beirut. Other international routes, now suspended, were to Athens and Cairo.
Head Office: Ankara, Turkey.
Executives: H. Unsal, general manager; H. Yegin, technical director; S. Iscen, operations director; T. Sayar, accounts director; C. Ozcivelek, commercial director.
Fleet: 21 DC-3, seven Heron.
Results for year ended December 31st, 1955: 178,221 passengers; 3,034 tons of freight and 1,129 tons of mail carried; 6,410,159 ton-km flown; total costs £1,126,666; total revenue £1,403,205, 1,186 staff.

U.A.T.—see Union Aéromaritime de Transport.

UMCA—see Uraba, Medellin and Central Airways, Inc.

Union Aéromaritime de Transport (U.A.T./Aéromaritime) was founded in 1949 and is connected with Cie. Maritime des Chargeurs Réunis. Services were opened to French Equatorial Africa and to Saigon. Comets were introduced on the African routes in 1953. Since January 1st this year U.A.T. has had the rights for the operation of all French services to Rhodesia, Mozambique and the Union of South Africa, and the company is operating between Paris and Johannesburg. U.A.T. also has 46 per cent of the traffic over the coastal routes from France and North Africa to Senegal, French Guinea and the Ivory Coast. In Afrique Noire there is to be equal distribution of traffic between U.A.T. and Air France.

A U.A.T. subsidiary, Aéromaritime, operates a network of feeder services in West Africa.
Head Office: Le Bourget, nr. Paris, France.
Executives: L. Vidal, president; J. Combard and R. Loubry, directors.
Fleet: seven DC-6A/B, one DC-4, eight Heron, two Noratlas, one Oxford; on order, one DC-6 (May 1958), two Noratlas (1956).
Results for year ended December 31st, 1955: 126,991 passengers; 8,854 tons of freight and 495 tons of mail carried; 45,765,712 ton-km flown; 1,350 staff. Financial details not available.

Union of Burma Airways was organized in 1948 with the Burmese Government subscribing 90 per cent of the capital. UBA operates domestic services and has international routes to Calcutta, East Pakistan, Penang and Singapore.
Head Office: Rangoon, Burma.
Executives: U. Chit, chairman; U. Taw, general manager; B. G. Jones, engineering supt.
Fleet: DC-3, Dove, Marathon; * on order, three Viscount 761.
*These aircraft are still owned by UBA but are not in service.
Traffic statistics not available.

United Air Lines, Inc., was organized on July 1st, 1931, as a management company for Boeing Air Transport, Pacific Air Transport, National Air Transport and Varney Air Lines. These companies enable United to claim continuous operation back to 1926 when Varney began service. In 1933 United pioneered the use of the low-wing twin-engined metal monoplane when it introduced Boeing 247s on its coast to coast route, cutting the journey time to 19½ hr. U.A.L. Inc., became an operating company in its own right on May 1st, 1934, following the Post Office mail contract fiasco.

In 1947 United opened a route from San Francisco to Honolulu and the company's present network extends from coast to coast over a number of routes. Hawaii is served from both San Francisco and Los Angeles. There are 14 nonstop flights a day between New York and Chicago and UAL has an extensive west coast system. Its DC-7s fly from New York to Los Angeles nonstop in 8 hr 35 min.
Head Office: Chicago, Illinois, U.S.A.
Executives: W. A. Patterson, president; R. E. Johnson, asst. to president; J. A. Herlihy, vice-

W. A. Patterson, president, United Air Lines.

Abdel Bagi Mohd,
gen. manager, Sudan Airways.

Grant W. G. McConachie,
president, C.P.A.

Count Dr. Carandini,
chairman, Alitalia.

J. H. Carmichael,
president, Capital Airlines.

Delos W. Rentzel,
chmn. and pres., Slick Airways.

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president engineering and maintenance; D. R. Petty, vice-president flight operations; C. Barkes, vice-president finance and property; R. W. Ireland, vice-president traffic administration; S. P. Martin, secretary; A. M. de Voursney, treasurer.
Fleet: 13 DC-3, 19 DC-4, 42 DC-6, 20 DC-6B, 25 DC-7, 55 Convair 340; on order, 30 DC-8 (1959-60), 23 DC-7 (1956-57), 17 DC-6B (1956-57), five DC-6A (1956).
Results for year ended December 31st, 1955: 5,574,533 passengers; 44,746 tons of freight and 29,503 tons of mail carried; 463,731,030 ton-miles flown; total costs £75,301,673; total revenue £84,134,967; 18,331 staff.

Uraba, Medellin and Central Airways, Inc.—UMCA operates Convair 240s thrice weekly between Balboa and Medellin. UMCA was founded in 1931, is a Pan American World Airways' subsidiary and operates its services with aircraft leased from P.A.W.A.
Head Office: Medellin, Colombia.
Executives: E. Balluder, president; R. G. Ferguson, treasurer; J. A. Mannion, secretary.
Fleet: Convair 240 leased from P.A.W.A.
Traffic statistics not available.

VARIG—see S.A. Empresa de Viação Aérea Rio Grandense

VASP—see Viacao Aerea Sao Paulo, S.A.

Vestlandske Luftfartselskap A/S. (West Norway Airlines) was founded, mainly by Bergen shipping interests, as a private company in 1947. Considerable charter work and ambulance flying is done, and since 1951 V.L.S. has operated scheduled flying-boat services over two routes, Bergen-Alesund-Molde-Kristiansund-Trondheim in summer and Bergen-Haugesund-Stavanger throughout the year.
All services were suspended during this winter. This summer it is proposed that the flying-boat services shall be resumed, and that land-plane services will be operated between Bergen and Trondheim, and Bergen and Stavanger.
Head Office: Bergen, Norway.
Executives: S. Liby, managing director; A. Wagner Larsen, chief engineer; R. F. Rasmussen, chief pilot.
Fleet: two Sealand,, two Seabee; on order, one Heron, two Twin Pioneer (1956 or 1957).
Results for year ended December 31st, 1955: 9,534 passengers; 82 tons of mail carried; 171,761 ton-km flown; 20 staff. Other details not available.

Viacao Aerea Sao Paulo, S.A.—VASP, was founded in 1934 and began scheduled operations in 1935. Most of the company's stock is held by the Sao Paulo city, State and Municipal Bank. The company operates over about 3,000 miles of domestic routes, and has no less than 60 flights a week in each direction between Sao Paulo and Rio de Janeiro. The airline flies both 2nd and 3rd class services.
Head Office: Sao Paulo, Brazil.
Executives: J. V. de Faria Lima, president; J. Castilho Cabral, vice-president; O. P. Pinto, director/executive.
Fleet: Saab Scandia, DC-3.
In 1954 VASP carried more than 250,000 passengers and flew more than 5,500,000 revenue ton-miles.

West African Airways Corporation, an associate of B.O.A.C., was founded in 1946 by the West African territories of Nigeria, Gold Coast, Sierra Leone and the Gambia. Most of the company's network is in Nigeria but services extend as far west as Dakar and the unduplicated route mileage is about 7,000. The Corporation developed extensive second-class services with its former fleet of Bristol 170s and, in fact, passengers on some routes are predominantly African.
Head Office: Lagos, Nigeria.
Executives: R. W. C. Baker-Beall, chairman; Lt-Col. M. L. P. Mostert, general manager; A. S. M. Furmiss, deputy general manager; R. R. R. Allen, chief engineer; A. A. Cooper, chief accountant; Capt. A. L. Greenacre, chief pilot.
Fleet: eight Heron, four Dove, two Bristol 170.
Results for year ended March 31st, 1955: 59,982 passengers; 1,621,528 ton-miles flown; total aircraft operating costs, £708,933; total traffic revenue, £611,920; 1,006 staff.

West Coast Airlines, Inc., was founded in 1941 under the laws of the State of Washington for the operation of passenger, mail and express services in the Pacific Coast area, but the C.A.B. held the application over until after the war and only granted certificates in 1946. The company took over Empire Air Lines in 1952 and now operates 2,000 miles of routes in Washington, Oregon and Idaho.
Head Office: Seattle, Washington, U.S.A.
Executives: N. Bez, president; G. Hamilton Beasley, executive vice-president; R. A. Duwe, secretary/treasurer; E. B. Code, vice-president operations; T. Croson, vice-president sales.
Fleet: 14 DC-3.
Results for year ended December 31st, 1955: 196,178 passengers; 99,533 freight ton-miles and 47,839 mail ton-miles flown; 3,323,249 total ton-miles flown; total costs, £1,333,256, total revenue, £1,263,647; 413 staff.

Western Airlines, Inc., claims to be the United States' oldest airline, having been founded in 1925 as Western Air Express. On April 17th, 1926, air mail services were begun between Los Angeles and Las Vegas and Salt Lake City and on May 23rd that year the first passengers were carried over the route. Western Air Express was part of the original TWA when it was formed in 1930 but Western regained its independence in 1934. The present name was legally adopted on March 11th, 1941. WAL now operates 5,525 miles of routes in the Western and mid-West states. One route extends across the Canadian border to Edmonton. Due to a strike WAL's services have been suspended since January 9th.
Head Office: Los Angeles, Cal., U.S.A.
Executives: T. C. Drinkwater, president; P. E. Sullivan, vice-president/secretary; J. J. Taylor, vice-president/treasurer; S. R. Shatto, vice-president operations; M. W. Landes, vice-president-service.
Fleet: eight DC-6B, nine Convair 240, six DC-4, eight DC-3; on order, 13 DC-6B (1956-57).
Results for year ended December 31st, 1955: 1,092,578 passengers; 5,435 tons of freight and 4,897 tons of mail carried; 54,999,000 ton-miles flown; total costs £9,645,000; total revenue £11,085,035; 2,130 staff.

Wheeler Airlines, Ltd., is Canada's oldest airline, having been founded in 1921. The company is mostly engaged in non-scheduled operations but maintains an Anson-operated service on weekdays between St. Jovite and Montreal.
Head Office: St. Jovite, P.Q., Canada.
Executives: F. H. Wheeler, president; R. Rychlicki, general manager; J. Bancroft, treasurer; G. Fitzgerald, secretary.
Fleet: Includes DC-4, C-46, Canso, Norseman, Beaver, Anson 5, Cessna 195 and Boeing 75 (for crop spraying).
Traffic statistics not available.

Wideröe's Flyveselskap og Polarfly A/S. is an old-established company engaging in many forms of air activity including charter flying and air survey. Wideröe's operated various pioneer air services around the Norwegian coast before the war, and for several years since the war the company has been operating the north Norway services for S.A.S. This year Wideröe's will operate all the S.A.S. floatplane services north of Bodö.
Head Office: Oslo, Norway.
Executive: V. Wideröe, general manager.
Fleet: one Otter and three Norseman on scheduled services and three Oxford, two Cessna, one Beaver, one Fairchild M-62A, one Luscombe Silvaire, one Piper L-4, one Seabee, one Wideröe Polar. May operate the S.A.S. Ju 52/3mW on northern routes this summer.

Wien Alaska Airlines, Inc., operates an extensive network of passenger, freight and mail services throughout most of Alaska. Operations are concentrated in the Fairbanks area with longer routes stretching to Nome in the west and Point Barrow on the north coast. The company has operated under its present title since 1936. Previously it had operated since 1929 as Northern Air Transport; its original operations began in 1924.
Head Office: Fairbanks, Alaska.
Executives: S. Wien, president; G. B. Rayburn, executive vice-president and treasurer; F. Wien, vice-president operations; J. P. Whaley, vice-president traffic; R. M. King, secretary.
Fleet: four Curtiss C-46, two DC-3, six Norseman, 10 Cessna (types 170, 180, 195).
Results for year ended December 31st, 1955: 16,431 passengers; 1,565 tons of freight carried; 1,593,040 ton-miles flown.

Woods Airways Pty., Ltd., was founded in 1947 and began scheduled operations in July 1948. The company's only route is that between Perth and Rottnest Island—a distance of 26 miles. Twelve services are flown in each direction every week and extra services are operated on demand.
Head Office: Perth, W. Australia.
Executives: Capt. J. Wood, managing director; G. L. S. Williams, secretary.
Fleet: two Avro Anson.
Results for year ended June 30th, 1954: 3,597 passengers; 3.1 tons of freight and 0.3 tons of mail carried; other details not available.

NOTE: the following Mexican airlines have not been included in detail as no recent information is available: Aeronaves de Michoacana, S.A.; Aeropostal Mexicana, S.A.; Aerovias Contreras; Compania Tabasquena de Aviacion, S.A.; Lineas Aereas del Sur; Lineas Aereas Guerrero-Oaxaca, S.A.; Linea Aereas Picho; Lineas Aereas Unidas, S.A.; Los Chenes, S.C.L.; Servicio Aereo Leo Lopez T.; Servicios Aereos de Chiapas, S.A. de C.U.; Transportes Aereos de Jalisco; Transportes Aereos Mexicanos, S.A.; Transportes Aereos Terrestres, S.A.; Transportes Aereos Yajalon, S.A.

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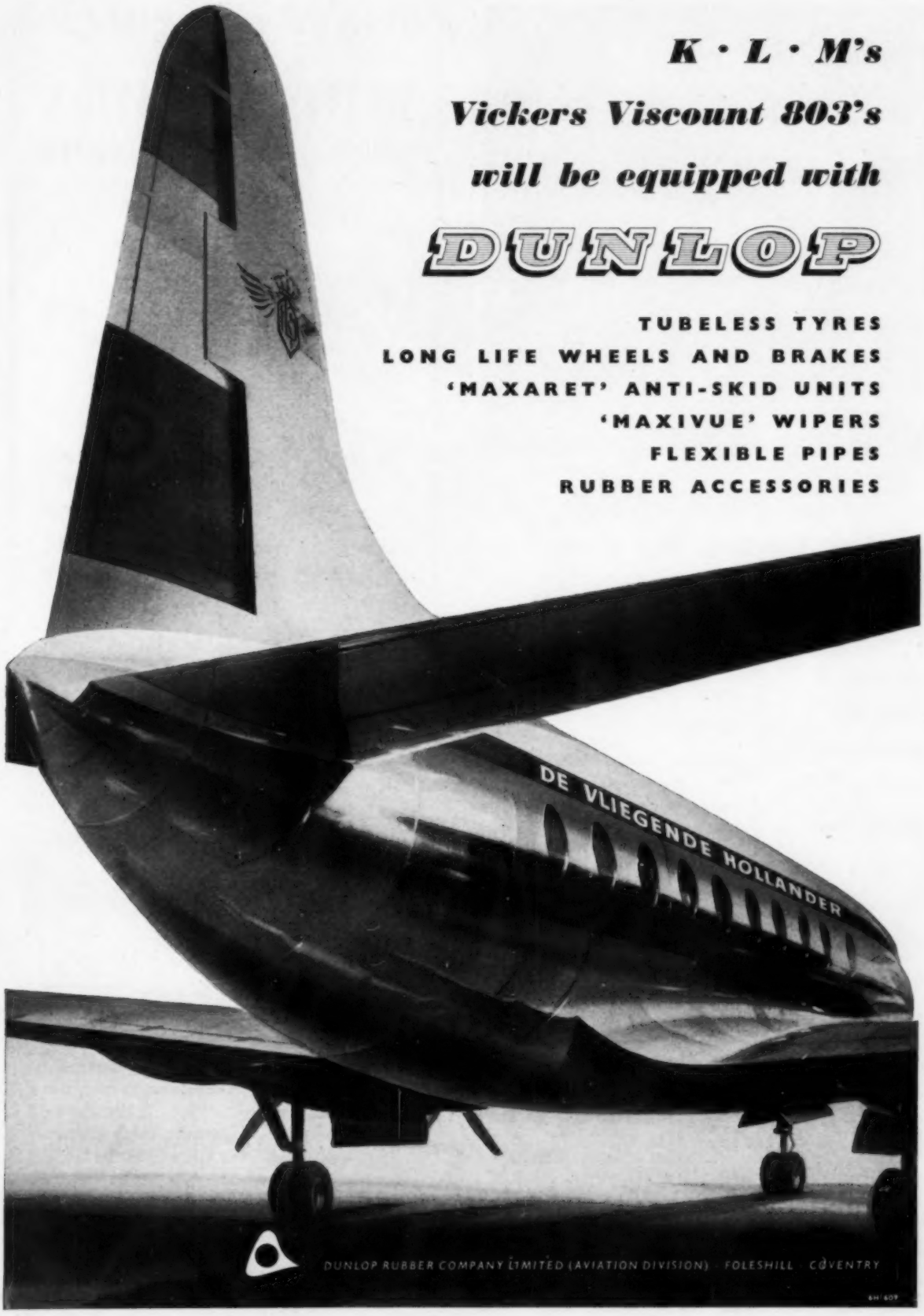

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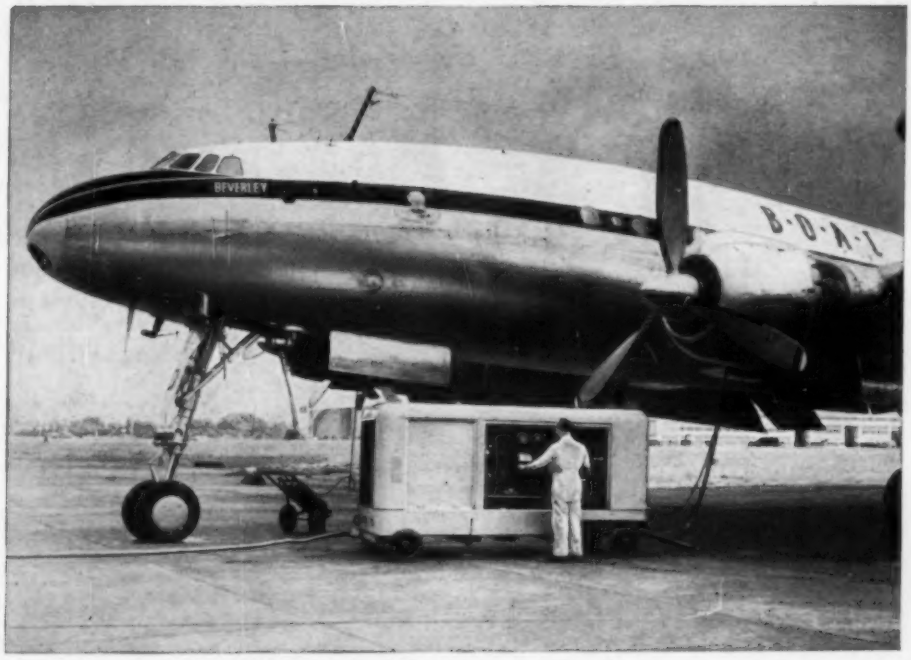

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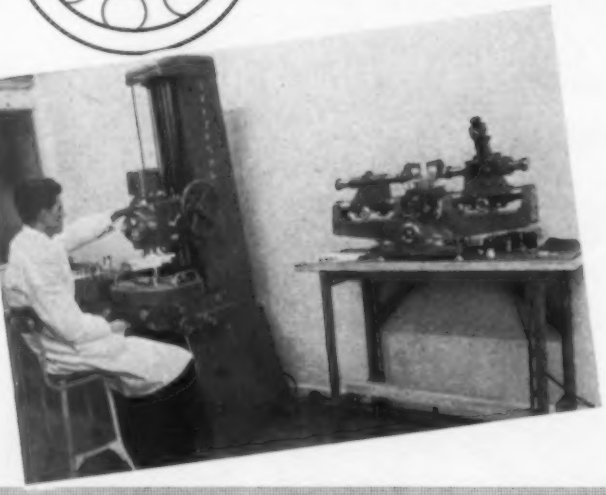

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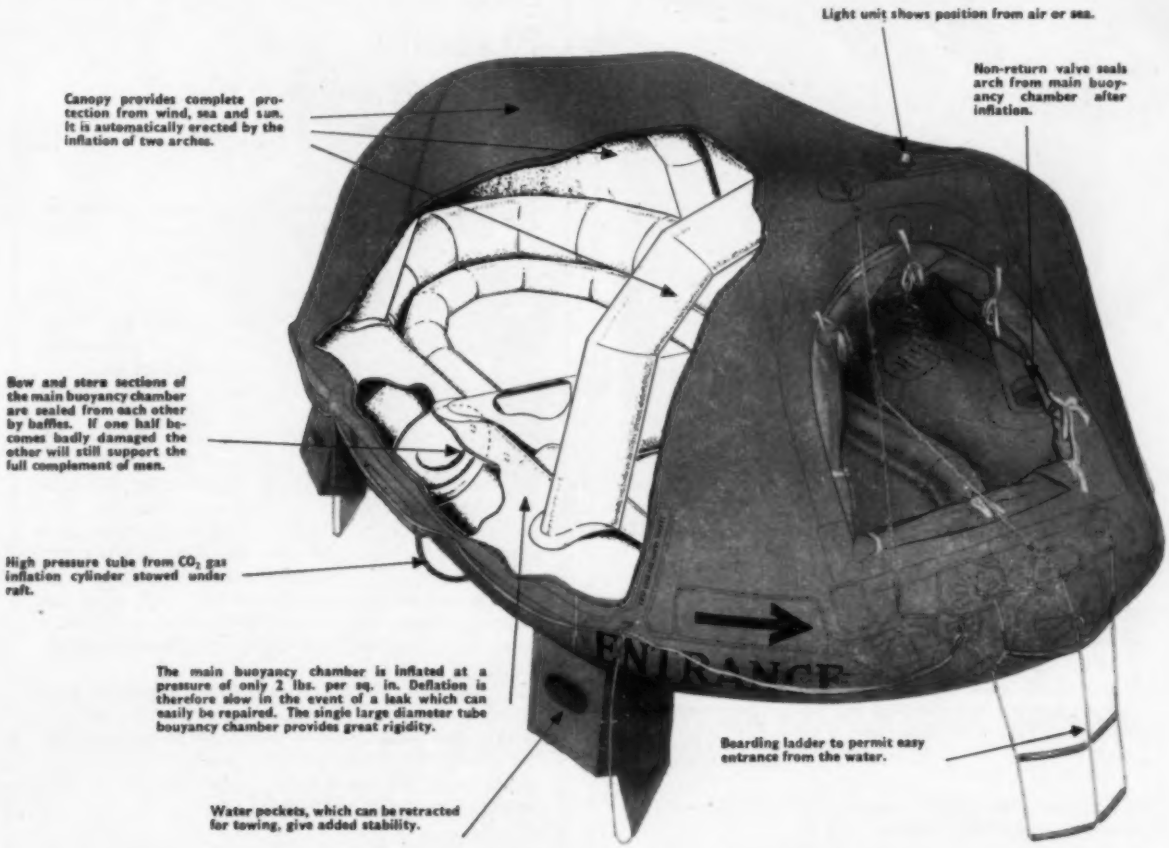
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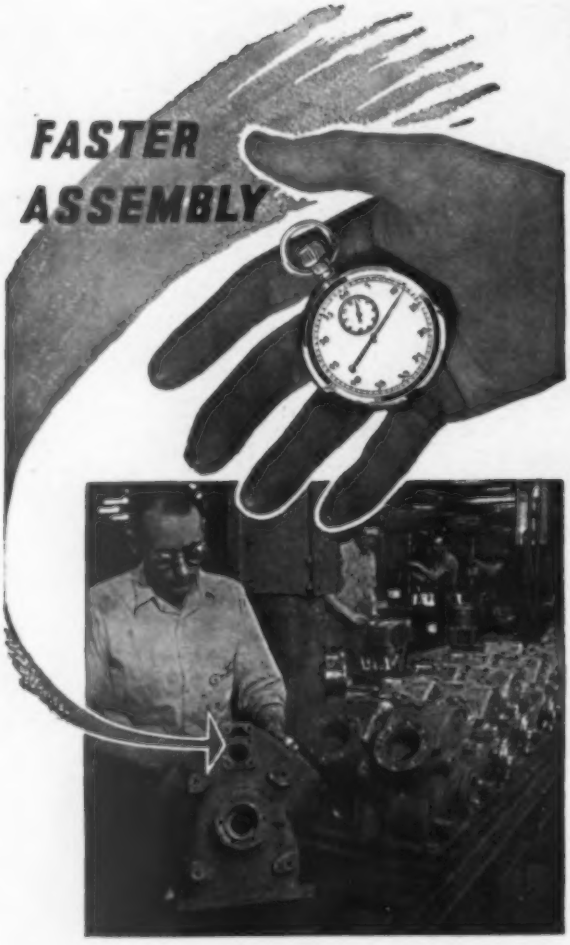

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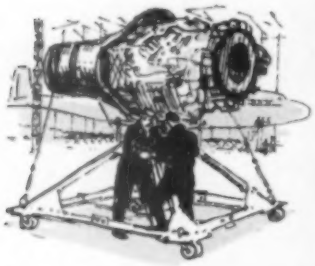

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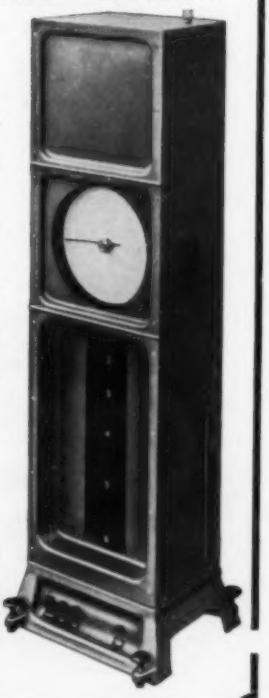

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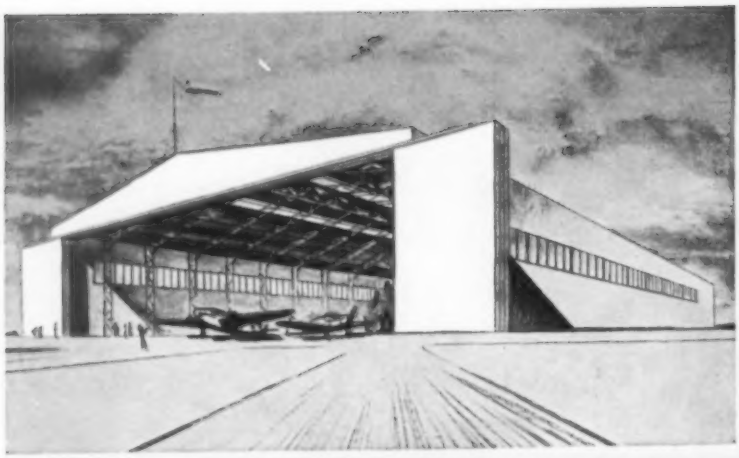

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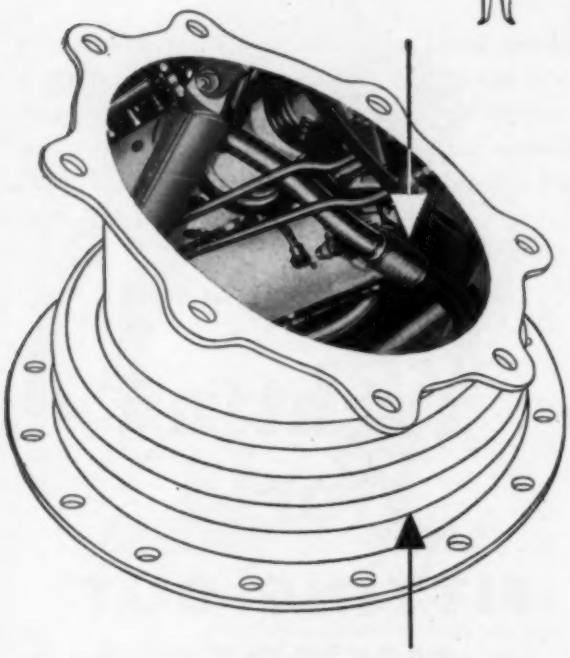

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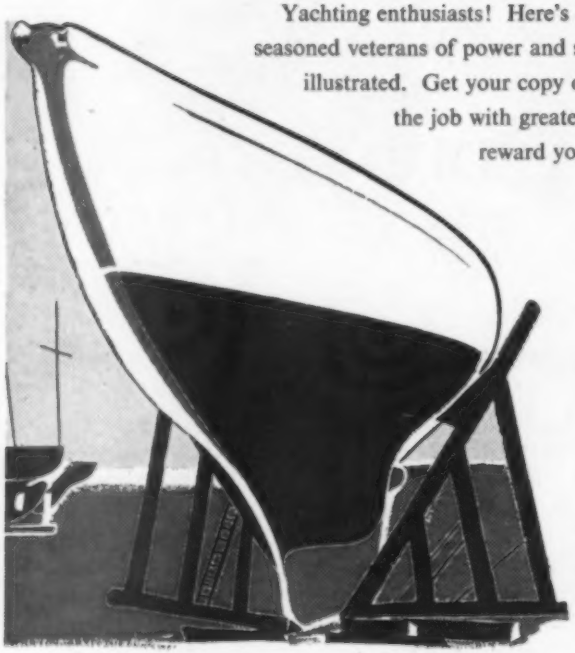

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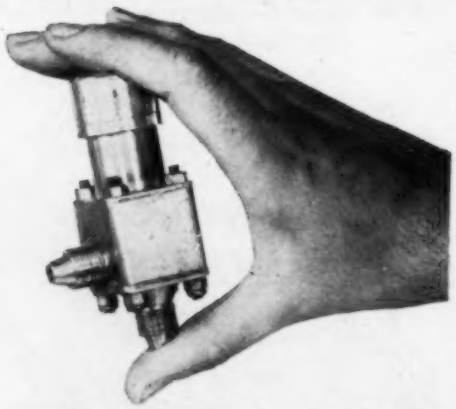

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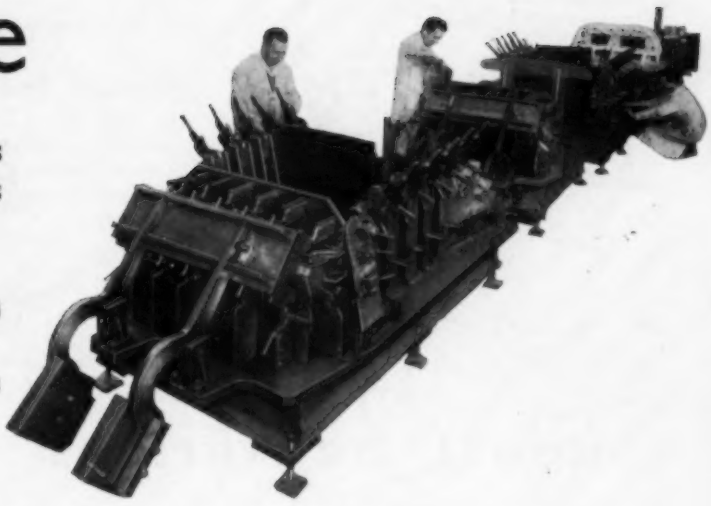

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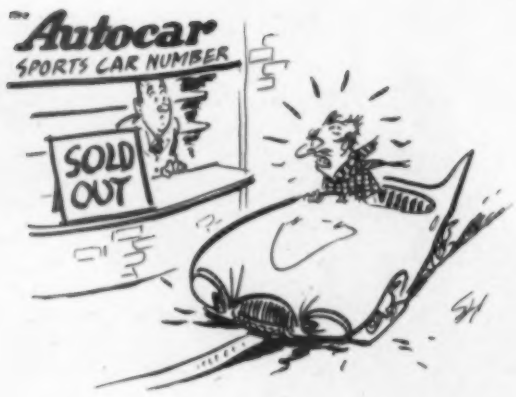

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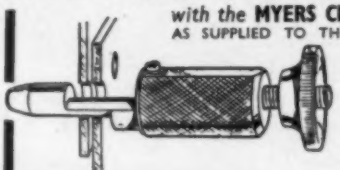

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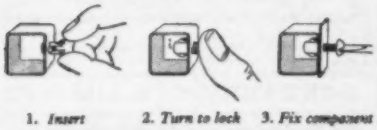

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APPLICATION No. 40/5. From Airlines (Jersey), Ltd., of The Parade, St. Helier, Jersey, C.I., for amendments to the terms of approval of the Internal Services which they are authorised to operate during the period up to 31st March, 1963, on the route London-Alderney-Guernsey and/or Jersey, so as to operate two additional return flights on Saturdays during the period 4th June to 30th September, 1956, on the sector London-Alderney (optional stop)-Guernsey/Jersey, and also so as to terminate their flights at Alderney as and when necessary.

FROM Eagle Aviation, Ltd., of 29, Clarges Street, London, W.1, for the following Seasonal Inclusive Tour Services for the carriage of passengers and supplementary freight in conjunction with Wenger Airtours, Ltd., to be operated on Saturdays and/or Sundays for a period of seven years from the Spring 1957:—

APPLICATION No. 770 for a service between London (Blackbushe) and Klagenfurt with Viking and/or Dakota aircraft at a frequency of one return flight fortnightly during the season from June to September inclusive each year.

APPLICATION No. 771 for a service between London (Blackbushe) and Tours with Viking and Dakota aircraft at a frequency of one return flight fortnightly during the season from May to September inclusive each year.

APPLICATION No. 772 for a service between London (Blackbushe) and Barcelona with Viking aircraft at a frequency of one return flight weekly during the season from April to September inclusive each year.

APPLICATION No. 773 for a service between London (Blackbushe) and Basle with Viking and Dakota aircraft at a frequency of one return flight weekly during the season from June to September inclusive each year.

APPLICATION No. 774 for a service between London (Blackbushe) and San Sebastian with Viking aircraft at a frequency of one return flight weekly during the season from May to September inclusive each year.

APPLICATION No. 775 for a service between London (Blackbushe) and Munich with Viking and/or Dakota aircraft at a frequency of one return flight weekly during the season from June to September inclusive each year.

APPLICATION No. 777 for a service between London (Blackbushe) and Pisa with Viking and/or Dakota aircraft at a frequency of one return flight weekly during the season from May to October inclusive each year.

APPLICATION No. 778 for a service between London (Blackbushe) and Palma with Viking and/or Dakota aircraft at a frequency of one return flight weekly during the season from May to September inclusive each year.

APPLICATION No. 776 from Eagle Aviation, Ltd., of 29, Clarges Street, London, W.1, for a Seasonal Inclusive Tour Service with Viking aircraft in conjunction with Wenger Airtours, Ltd., for the carriage of passengers and supplementary freight between London (Blackbushe) and Innsbruck at a frequency of one return flight fortnightly to be operated on Saturdays during the season from mid December to February inclusive each year, for a period of seven years, commencing 15th December, 1956.

THESE applications will be considered by the Council under the Terms of Reference issued to them by the Minister of Civil Aviation on 30th July, 1952. Any representations or objections with regard to these applications must be made in writing stating the reasons and must reach the Council within 14 days of the date of this advertisement, addressed to the Secretary, Air Transport Advisory Council, 3, Dean's Yard, London, S.W.1, from whom further details of the applications may be obtained. When an objection is made to an application by another air transport company on the grounds that they are applying to operate the route or part of route in question, their application, if not already submitted to the Council, should reach them within the period allowed for the making of representations or objections. [5122

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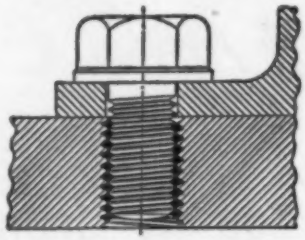

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Vacancies exist on super-priority work for

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on
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(Experienced Structural, Electrical and Mechanical Draughtsmen also required. Aircraft experience not essential)

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(For both strength and flutter calculations)

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GREENGATE, MIDDLETON, MANCHESTER

have vacancies on Super-Priority Design and Development Projects for

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Applications are invited from individuals having Aircraft, Mechanical, Structural or Electrical experience.

Salaries will be arranged according to experience and ability.

Applications will be treated in strict confidence and should be addressed, in the first place, quoting Ref. PM/1 to:

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The engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour and National Service, etc., if the applicant is a man aged 18-64 or a woman aged 18-59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order 1952.

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These jobs are permanent for suitable people and offer every opportunity for advancement. Working conditions and rates of pay are excellent.
Write to:

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Please state if you prefer our Brough, London or Leeds Design Offices. [5022

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Air Traffic Control Officers Grade II

QUALIFICATIONS: (a) Aircrew experience preferably as pilot or navigator; and (b) successful completion of a recognised course in air traffic control; and (c) actual experience as A.T.C.O. on sole watch-keeping duties, preferably with experience in tropical territories.

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There are vacancies for Senior, Intermediate and Junior Draughtsmen with experience of aircraft design, and applications from Draughtsmen and Draughtswomen without such experience will also be given careful consideration.

Numerous advantages can be offered to those joining this expanding organisation, including good prospects of promotion, really worthwhile salaries and the opportunity to become members of an enthusiastic and friendly group, working in a pleasant modern office.

Applications, giving details of age, experience, etc., and quoting ref. F.80, should be addressed to the Personnel Officer, Saunders-Roe, Limited, 37 Queen Square, London, W.C.1.

(Weekend interviews will be arranged in London.) [5042

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for work on new and interesting projects. Minimum standard O.N.C. or equivalent. Good salaries and prospects. Contributory pension and life assurance scheme.

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Appointments are immediately available for draughtsmen, technicians, engineers and scientists who have design, development or testing experience in one or more of the following:—

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LARGE, expanding, light engineering Company in South Midlands is prepared to engage selected number of Young Men (23-30) for training through technical work, foremanship and on eventually to Managerial posts. Qualifications required:—

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(iii) Five-year Apprenticeship in reputable engineering firm or equivalent experience.

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LIMITED, HURN DEPOT,

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Engaged on the production of Viscount aircraft have immediate vacancies for:—

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Applications, quoting date and prefix letter of advertisement to: Employment Manager, Vickers-Armstrongs (Aircraft), Limited, Hurn Depot, nr. Bournemouth, Hants. [5078

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LIMITED

require

Senior, Intermediate and Junior

DRAUGHTSMEN
STRESS ENGINEERS
AERODYNAMICISTS

and other Technicians at their London, Eastleigh and Osborne, I.o.W. design offices.

Applications will be welcomed from experienced technicians who are keen to join an expanding organisation engaged on interesting and advanced projects of an important nature.

Conditions are good and assistance with accommodation can be given to those selected to work at Osborne.

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Please send brief particulars (quoting ref. F/52) to the **Personnel Officer, Saunders-Roe Limited, East Cowes, I.o.W.**

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Interesting long term employment is available on a wide range of

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Single lodging accommodation available near works.

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SITUATIONS VACANT

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EASTERN Provincial Airways require two licensed and two unlicensed engine and airframe mechanics for service at Gander on Beavers, Otters and Lockheed 10s. Three year contract. Two months leave in U.K. every three years. Accommodation will be provided. Starting pay £100 per month for licensed and £70 for unlicensed personnel.

APPLY in first case to Personnel Officer, Ferry Airports, Limited, Blackbushe Airport, Camberley, Surrey. [5118

A FLIGHT Test group has the following staff vacancies:

(a) a man with some mathematical qualifications, and an interest in pre-flight assessment and trials analysis for autostabiliser work.
(b) a man with instrument experience for outside servicing and installation.

SOME knowledge of servo systems would be an advantage for both posts. Pension scheme. Please apply in writing giving full particulars to: Personnel Officer, Louis Newmark, Ltd., Prefect Works, Purley Way, Croydon, Surrey (Lodge Hill 2131, Extension 21). [5120

DERBY AVIATION, LTD., require the following flying personnel to operate from their base at Derby Airport:

1. Captain for Dakota and Marathon aircraft. Minimum senior commercial and instrument rating.
2. First Officer for Dakota aircraft. Minimum commercial and instrument rating.
3. Staff Pilot, mainly for duties on Anson aircraft. Must hold current commercial licence.

APPLY in writing to Derby Aviation, Ltd., Derby Airport, Burnaston, Derby. [5125

WANTED A and C Engineer. Good wages, accommodation arranged. Giro Aviation Co., Ltd., Southport, Lancs. [5134

QUALIFIED Flying Instructor required, also commercial pilot. B.A.L.P.A. rates. Air Navigation, Ltd., Blackpool Airport. [5132

FLYING Instructor wanted. Private pilot with full rating considered. Lancashire Aero Club, Barton Aerodrome, Eccles, Manchester. [5108

STRESSMEN required for work on interesting project in new and expanding department of well established firm. Good opportunities in pleasant office situated near south Devon coast. Cheap flying scheme. WRITE, stating age, experience and salary required to:—

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APPLICANTS must be fully experienced in all aspects of airframe estimating and T/C procedures. An estimator with a sound knowledge of airframe assembly and installation work is also required, previous experience essential. Applications should be marked "Confidential" and addressed to the Secretary at South Shore, Blackpool. [5116

WANTED, skilled technician to carry out C. of A., etc., on two private Tiger Moths in Blackpool district. Must have the correct qualifications. Replies to Box No. 1113. [5109

TEST and Laboratory Engineers required for gyro and electro mechanical instruments. Apply stating age, experience and salary required to S. G. Brown, Ltd., Shakespeare Street, Watford, Herts. [0147

DRAUGHTSWOMAN required by Aircraft Equipment Company in South Bucks. Salary, according to age and experience, up to £13 per week. Apply to Box No. 1001, c/o Flight. [5085

AIRCRAFT section leader design draughtsmen required. Salary according to age, experience and qualifications up to £900 per annum. Pension scheme/superannuation fund in operation. Write or phone BAYNES AIRCRAFT INTERIORS LIMITED, Langley Aerodrome, Bucks. Telephone: Langley 451. [5101

BRITISH OVERSEAS AIRWAYS CORPORATION invite applications for the post of Operations Development Officer in the Development Unit at London Airport.

THE successful applicant will assist a senior operations development officer on work including the analysis of aircraft performance data for use in the Corporation's current operations.

QUALIFICATIONS: A degree or its equivalent in aeronautical engineering. Appropriate experience in aircraft manufacturers' technical offices or in the air transport industry, or work in a Government establishment on aircraft of performance and weight analysis and flight testing. Some experience on turbine engines is desirable. The salary for the post will be £905 per annum to £1,120 per annum.

APPLICATIONS giving full details to the Assistant Staff Manager (Appointments), London Airport. [5099

THE Aerodynamics Department of Armstrong Siddeley Motors has vacancies for both Senior and Junior Development Engineers for work on axial flow compressors, turbines and general airflow. A Degree in Mechanical Engineering and previous experience in this type of work an advantage. Initial salaries range from £650-£1,050 per annum dependent on age, experience and qualifications but superscale rates would apply to senior experienced men. Excellent prospects and good pension fund. Applicants should give full details quoting Reference Airflow 2, to Technical Personnel Manager, Armstrong Siddeley Motors, Coventry. [0466

SITUATIONS VACANT

DRAUGHTSMAN (intermediate) preferably with aircraft experience required for new drawing office at Stansted airport. Limited single hostel accommodation. Salary according to age and experience in scale £8 7s. 6d. to £15 2s. 0d. per week. Apply with full details to Personnel Manager, Skyways, Ltd., Stansted Airport, Stansted, Essex. [5115

DESIGNERS. First-class senior designers are required for interesting work on the design of gas turbine fuel systems and controls. These appointments offer excellent opportunities to the right individuals but only first-class senior designers need apply. Applications to be sent to Personnel Manager, Joseph Lucas (Gas Turbine Equipment), Ltd., Shaftmoor Lane, Hall Green, Birmingham, 28. [5035

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WIND TUNNEL MODEL DESIGNER. A vacancy exists for an experienced Wind Tunnel Model Designer, to be attached to the Aerodynamic Section, Weapons Research Division, A. V. Roe & Co., Ltd., Woodford, Cheshire. This is a new position, and the successful applicant will be responsible for the design of models for many of the country's Tunnel facilities, and for liaison with the test establishments on the progress and manufacture of the models.

LETTERS should be addressed to the Chief Designer. [5067

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Designer with D.O. experience in similar field.

Technical Assistants for thermodynamics and combustion.

Junior Development Engineer for Fuel Systems.

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Technical Assistants, Senior and Junior, for general analysis, especially with aerodynamic and thermodynamic experience.

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Technical Assistants & Aerodynamicists (Senior & Junior) for assessment of performance of future projects and general design analysis.

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Structural & Mechanical Test Assistants with experience in experimental stress analysis.

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Stressmen with aircraft experience for new installations and special projects. Wide variety of interesting work.

Junior Weight Control Engineer to work in conjunction with above, aircraft experience desirable.

Applicants should in general be of about H.N.C. Degree standard, or with O.N.C. for Junior posts, and should write to: **DEPT. C.P.S., 336/7, STRAND, W.C.2., quoting Ref. 1368V.**

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DEVELOPMENT Engineers and Physicists are required for work in the new and rapidly expanding laboratories of Louis Newmark, Ltd., at New Addington, Surrey. The work includes the design and development of instruments and equipment for the aircraft and allied industries, and some working experience of small electromagnetic instruments is desirable. A degree or similar qualification essential. Good salary based on age and experience. Contributory pension scheme. Apply in writing giving full particulars to: Personnel Officer, Louis Newmark, Ltd., Prefect Works, Purley Way, Croydon. [5119

WEAPONS RESEARCH DIVISION

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is required for design work connected with the ground and air launching of guided missiles. This is a senior staff position carrying a good salary and prospects of advancement in an expanding organization.

The company has a pension and life assurance scheme, and the Division is situated in pleasant surroundings, with convenient access to Stockport and Manchester.

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Applications to:

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WOODFORD, CHESHIRE

SITUATIONS VACANT

JUNIOR Detail Draughtsman required for Aircraft Component Development. Aircraft experience preferred but not essential. Reply in writing to: King Aircraft Corporation, Fifth Street, Montrose Ave., Hillington, Glasgow, S.W.2. [0421

CANADIAN firm requires technicians with experience on American type aircraft. Preferably single. Apply Chief Engineer, giving details, qualifications, Allied Aviation Company, Gander, Newfoundland. [5040

WANTED—Bush Pilot for West Africa. Minimum qualifications senior commercial and instrument rating. 1,000 command hours. Beaver experience an advantage. Apply Chief Pilot, Hunting-Clan Air Transport, Ltd., London Airport, Hounslow, Middx. [5097

CHIEF Designer. Aircraft and commercial hydraulics including light pressure pumps and accessories, company wishes to extend its interest in the above. Situation offers exceptional opportunity to experienced executive with ability to technically control development. Box No. 1201. [5128

PRODUCTION Manager required by company in Eastern Counties engaged on repair, modification and trial installation work on multi-jet and turboprop aircraft. Must have sound technical and administrative experience in aircraft manufacture or repair. Address applications giving age, experience, and when available to Box No. 1202. [5129

SENIOR Design Draughtsman, accustomed to working with the minimum of supervision, required for Aircraft Component Department. Aircraft experience preferable but not essential. Salary in accordance with experience and qualifications. Reply in writing to: King Aircraft Corporation, Fifth Street, Montrose Ave., Hillington, Glasgow, S.W.2. [0420

SITUATIONS VACANT

ASSISTANT required for production controller of aircraft repair organisation operating in Eastern Counties. Executive position requiring a high degree of initiative and ability to deal with administrative problems at all levels. Previous experience in this field not essential. Full particulars of age, experience, and when available to Box No. 1203. [5130

VACANCIES for two Air Traffic Control Officers exist at the States of Guernsey Airport. The posts will be to the established staff of the States of Guernsey, pensionable, and within the salary range of £750/£1,020, dependent upon age and qualifications. Applicants must be not less than 23 and not more than 35 years of age and be in possession of current Air Traffic Control Certificates endorsed by the Ministry of Transport and Civil Aviation. Possession of radar rating will be an advantage. Application in writing stating age, qualifications and other relevant details must be made to the Airport Commandant, States Airport, Guernsey, Channel Islands, not later than Friday, 4th May, 1956. [5100

PILOT required by Nigerian Federal Government on contract for 12/24 months in first instance. Salary scale (including inducement addition) £1,608 rising to £1,824 a year. Commencing salary according to experience. Gratuity at rate £150 a year. Outfit allowance up to £60. Free passages for officer and wife. Assistance towards cost of children's passages and grant up to £150 annually for maintenance in U.K. Liberal leave on full salary. Candidates preferably aged 25-40, must possess a C.P.L., instrument rating, and radio telephony licence, with at least 1,000 hrs. as pilot-in-charge of single and twin-engined aircraft. Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M3B/42728/FE. [5104

GUIDED MISSILES

A Senior Engineer is required by an important Company, engaged on major guided missile projects, to take charge of work associated with the flight trials of these weapons.

The main responsibilities of this post are to co-ordinate the work of a large group of technicians engaged on this task; the work is of a very interesting and varied character, and covers overall system testing and the analysis and the behaviour of installations covering mechanical, hydraulic, electronic and electrical engineering.

A University Degree or its equivalent is required in one of the following branches of engineering:—

Servo-control systems, Electronic and Electrical Engineering, Radar, radio and telecommunications.

The salary scale will be commensurate with the high degree of responsibility associated with this Senior post, and the successful applicant will be eligible for the Company's attractive Superannuation Scheme.

All replies should be addressed to:—

TECHNICAL APPOINTMENTS OFFICER,
BOX No. 1019, c/o FLIGHT, QUOTING REFERENCE L/4.

STRESSMEN

Vacancies exist for senior and intermediate Stressmen with sound aeronautical experience to join progressive and rapidly expanding organisation.

Applicants must have completed National Service and have high degree of enterprise and initiative.

Good salaries will be paid in accordance with ability and experience.

Write:

Chief Draughtsman,
Microcell, Ltd., 56 Kingsway, W.C.2.

BROOKLANDS AVIATION LTD.

NORTHAMPTON

REQUIRE

AIRFRAME FITTERS

and

INSPECTORS

Preference given to ex R.A.F. and R.N.A.S. Technicians

Regular work with Bonus and Overtime

APPLY TO

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have Vacancies on After Sales Service for

(x) **AIRCRAFT SERVICING ENGINEERS (Airframe)** with "A" licences preferably endorsed for Viking or four-engined aircraft; for representative work on Viscount aircraft overseas, after gaining the necessary experience at Weybridge.

(y) **TECHNICAL LIAISON ENGINEERS (Airframe and Electrical)** in the Civil Aircraft Service Department. Applicants should be well educated, including an apprenticeship or similar training, and have had some experience on aircraft design.

Applications, quoting date and prefix letter of advertisement to:

Employment Manager,
Vickers-Armstrongs (Aircraft) Limited,
Weybridge.

A. V. ROE & CO., LIMITED

HAVE ONE OR TWO VACANCIES FOR

DESIGN & DEVELOPMENT DRAUGHTSMEN

to work on Guided Weapons at Woodford Aerodrome, Cheshire. Applicants should be experienced Aircraft Draughtsmen.

This is an excellent opportunity to join an expanding organisation. Attractive salaries will be paid to suitably qualified personnel. Working conditions are exceptional.

Written applications, which will be treated in confidence, should be addressed quoting Ref. WRD/DD, to:—

THE PERSONNEL MANAGER,
A. V. ROE & CO., LIMITED,
GREENGATE, MIDDLETON,
MANCHESTER

MARSHALL
AIRPORT WORKS CAMBRIDGE

AIRCRAFT INSPECTORS

REQUIRED

Airframe and Electrical

APPLICATIONS FOR THESE VACANCIES CAN ONLY BE CONSIDERED FROM THOSE WITH RECENT EXPERIENCE ON MODERN SERVICE OR CIVILIAN AIRCRAFT

(Repair, Modification & Trial Installation)

Accepted Applicants who successfully prove their suitability for these vacancies will find themselves teamed with a management willing to give any assistance calculated to expedite 'settling in' on a long term basis with a minimum of delay. This includes assistance with housing where necessary, but in the initial stages hostel or private lodging accommodation is available if required.

Written applications giving full particulars of experience, etc., should be addressed to
EMPLOYMENT OFFICER

SITUATIONS VACANT

A VACANCY exists in a progressive firm at Letchworth, Herts., for a senior aerodynamicist or physicist with initiative and tact to take charge of a group of project officers and their assistants engaged on research and development work of an interesting and varied nature.

CANDIDATES must be between 25 and 35 years old. They must possess a first class Honours Degree in either physics or mathematics, and have had practical experience of wind tunnel and flight testing and have been for some time in charge of important projects.

A SALARY in the range of £1,200 to £1,350 depending on qualifications and experience, will be given to the successful candidate.

THE post is pensionable after a qualifying period. Apply Box 1133. [5111

BAHAMAS AIRWAYS LIMITED, Nassau, urgently require licensed aircraft engineers with 'A' and 'C' licences covering Heron aircraft and Gipsy Queen 30 engines. Commencing salary according to qualifications within the scale £1,560-£1,976 p.a. Provident scheme in operation. Four weeks annual leave.

APPLICATIONS to Personnel Officer (Associated Companies), P.406, B.O.A.C. Headquarters, London Airport, Feltham, Middx. [5102

LICENSED Ground Engineer required to take charge of aircraft on small flying school and repair section. Minimum requirements A & C Licence, B an advantage. Good prospects for applicant with initiative. Apply Goodhew Aviation Company Limited, Oxford Airport, Kidlington, Oxford. Tel.: Kidlington 3355/7. [5065

KING AIRCRAFT CORPORATION require Senior, Intermediate and Junior Draughtsmen, and Stress Engineers, at their Central Glasgow Design Offices for work on an expanding programme of interesting and important projects of an advanced nature. Good salaries and conditions. Forward details of previous experience to:—Personnel Officer, King Aircraft Corporation, Hillington, Glasgow, S.W.2. [0422

WIND TUNNEL MODEL DRAUGHTSMAN. A vacancy exists for an experienced Wind Tunnel Model Draughtsman to be attached to the Aerodynamics Section, Weapons Research Division, A. V. Roe & Co., Ltd., Woodford, Cheshire. This is a new position, and the successful applicant will be responsible for the design of models for many of the country's Tunnel facilities, and for liaison with the test establishments on the progress and manufacture of the models.

LETTERS should be addressed to the Chief Designer. [5067

WANTED, draughtsmen to design in aluminium for sales development. Must possess Higher National Certificate in Mechanical Engineering. Location Banbury. Good working conditions and pleasant surroundings. Attractive starting salaries offered up to £800 p.a. with prospects of promotion from drawing board. Pension plan in operation. Send brief details of qualifications and experience to Northern Aluminium Co., Ltd., Bush House, Aldwych, London, W.2. [0348

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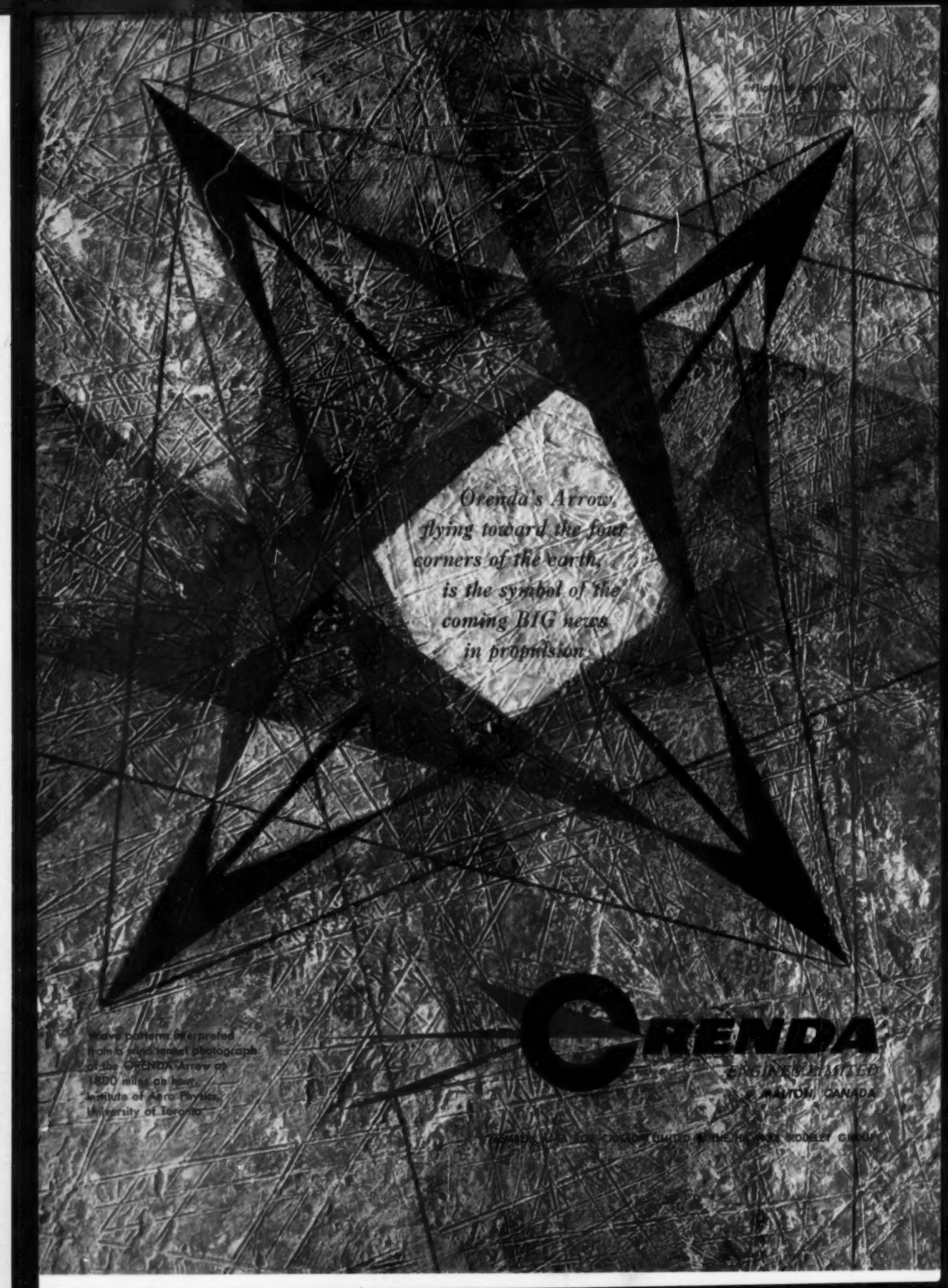
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